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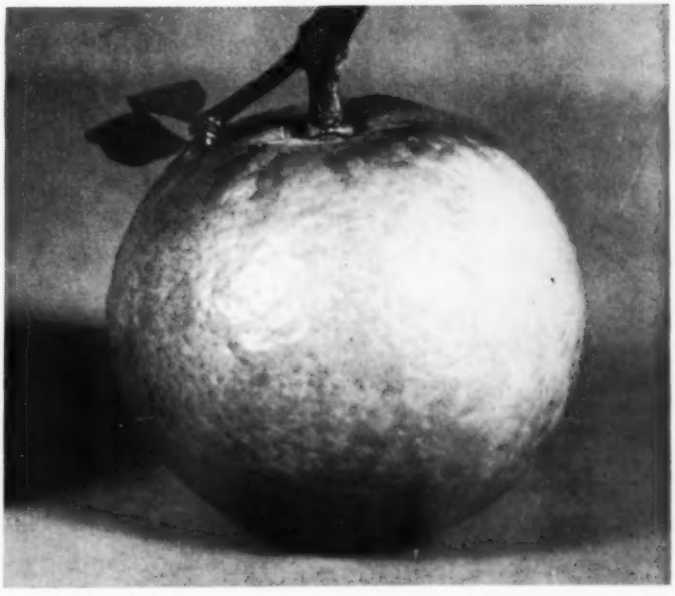

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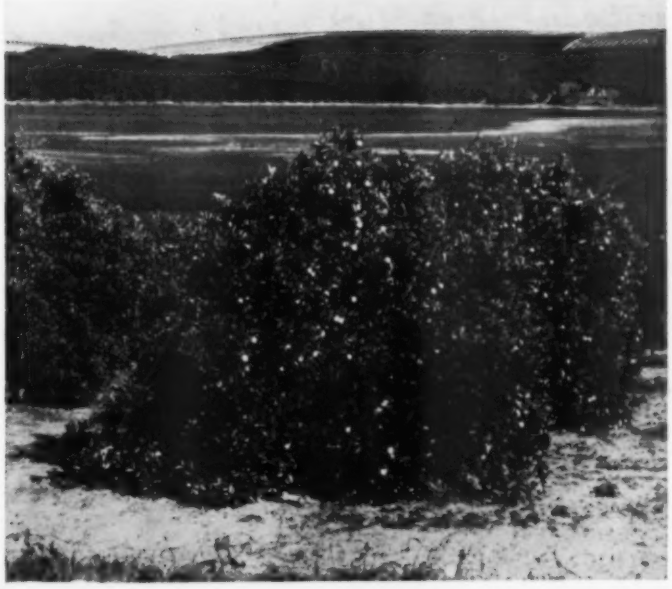
The Florida Murcott

Branch

Grove



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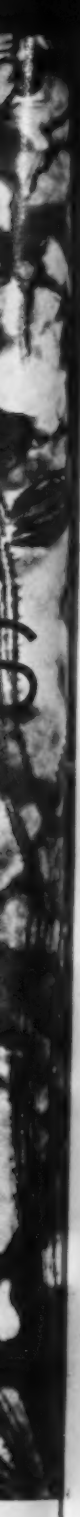

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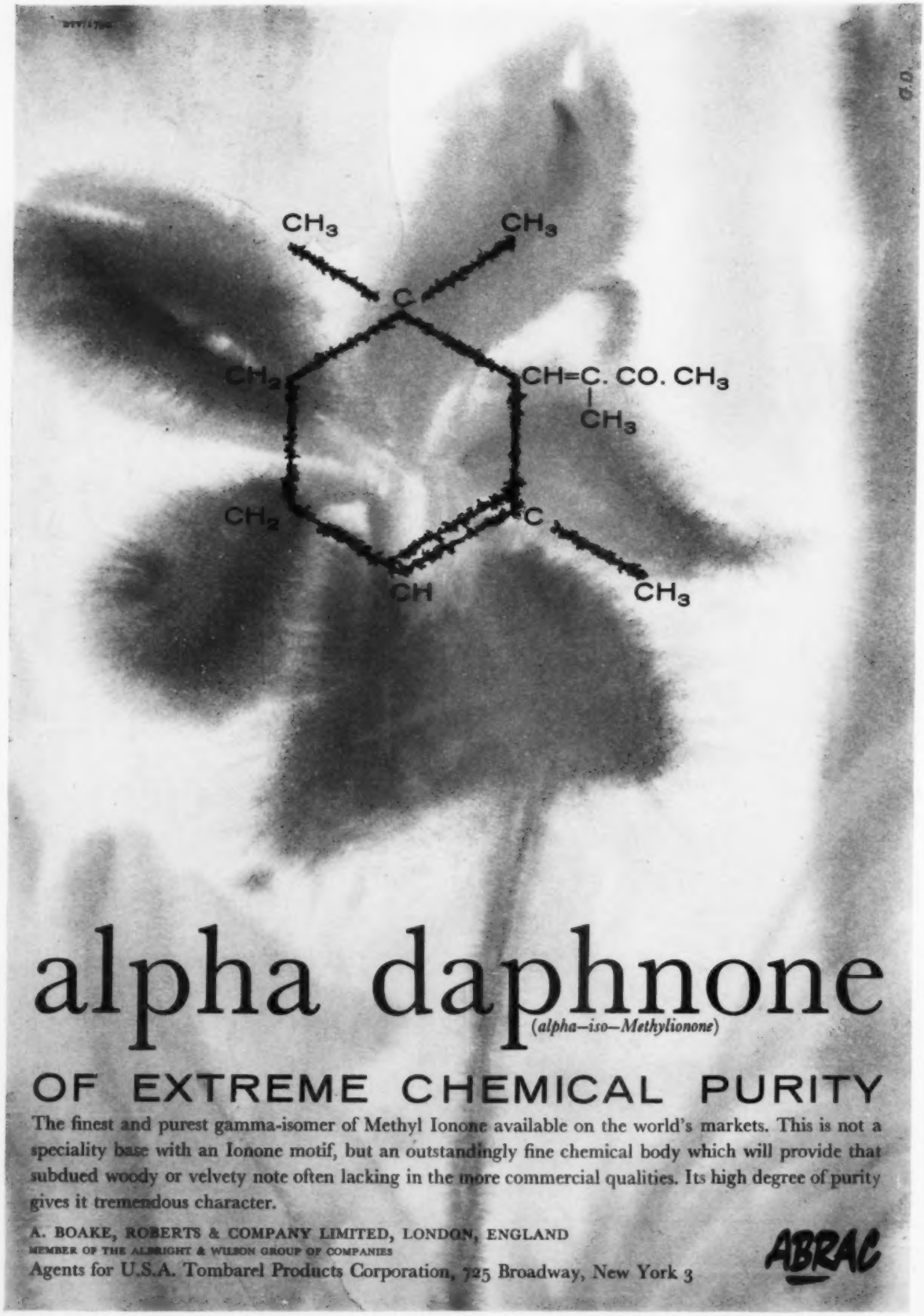

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American Perfumer

VOL. 75, NO. 11 NOVEMBER, 1960

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418 North Austin Blvd.
Oak Park, Illinois
VIllage 8-6310

Eastern Office
358 Fifth Avenue
New York 1, New York
LOngacre 3-4382

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Published Monthly by Allured Publishing Corporation. Publication office: 1309 North Main Street, Pontiac, Illinois, U.S.A. Editorial and executive offices: 418 North Austin Boulevard, Oak Park, Illinois. P. W. Allured, President. Subscription Rates U.S.A., Possessions and Canada, $5 one year; $1.00 per copy. Other countries $15 one year. Second class postage paid at Pontiac, Illinois. Allured Publishing Corporation is also publisher of The Manufacturing Confectioner, The Candy Buyers' Directory and Dulcedustria.

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Contenido

Colorantes Certificados: Algunos Problemas de Color y Colorante que se Presentan al Revisarse Fórmulas

Cuando se efectúan cambios importantes en la formulación de productos coloreades, es necesario equilibrar muchos factores, especialmente las propiedades físicas y químicas de los colorantes substitudos y/u otros ingredientes. Se tratan aquí estos factores, fórmulas de colorante de ensayo, y auxiliares para hacer juegos de colores, así como se muestran también veintinueve curvas espectrales.

Factores que influyen en el efecto bronceador de la dehidroxi-acetona sobre la piel

El color marrón-rojizo que produce la dehidroxi-acetona en la piel es aparentemente una reacción de proteínas no específica causada por una combinación directa con la queratina de la piel. El color es afectado por el espesor de la piel, la potencia de las soluciones, y el número de aplicaciones.

Aceite Murcott de florida prensado en frio

En anticipación a la prespectiva de que el incremento en las plantaciones de Murcott pudiésen conducir algún día al empleo del excedente y de frutas segregadas para procesamiento, en cuyo caso el aceite Murcott se convertiría en un artículo comercial, se han determinado y presentado las características físicas y químicas del aceite, expresadas por el extractor FMC-In-Line.

Flores de manzanilla

El uso reciente de azulenos y substancias azulogénicas obtenidas del aceite volátil de las flores, así como también extractos e infusiones de la droga, en especial fórmulas tónicas, cremas para el cabello, pastas dentífricas, cosméticos, champús, etc., constituye otro ejemplo del interés renovado hacia substancias botànicas por las industrias farmacéutica y de cosméticos.

La respiración de la piel es vital para la buena salud

Se han descrito métodos para medir la respiración de la piel. En apoyo de la sugerencia de que la respiración de la piel constituye un medio de determinar la salud de la piel, se ha demostrado que algunas condiciones patológicas y la acción de ciertos reactivos tóxicos se caracterizan por un descenso en la respiración de la piel.

Copolimero de vinila en el comos cosmético

En este estudio se describe en general el acetato de polivinila, y específicamente un copolimero singular. Describe su derivación y polimerización, así como también la preparación de copolimeros de acetato de vinila, y sus propiedades útiles en la industria de cosméticos. Se presentan datos sobre rocíos fijadores de cabellera, propiedades de aerosol, y ensayos de seguridad.

Contenu

Colorants Certifiés: Certains problémes de couleur et de colorants qui se présentent au moment de reviser les formules

Lorsqu'on effectue des changements importants dans la formulation des produits colorés, il est nécessaire d'équilibrer plusieurs facteurs, spécialment les propriétés physiques et chimiques des colorants employés comme substituants et/ou autres ingrédients. Les facteurs ci-après sont discutés: formules de colorants d'essais, auxiliaires pour combination de coleurs, et il y est montré également vingt-neuf courbes spectrales.

Facteurs influencant l'effet de bronzage de la déhydroxy-acétone sur la peau

La couleur rougeâtre et brunâtre produite par la déhydroxy-acétone sur la peau est apparement une réaction de protéine non-spécifique, causée par une combinaison directe avec la Kératine de la peau. La couleur est affectée par l'épaisseur de la peau, la puissance des solutions et le nombre d'applications.

Huile Murcott de florida comprimee a froid

En anticipation de la perspective qu'un accroissement des plantations de Murcott pourrait un jour résulter dans l'utilisation du surplus et des fruits cueillis pour être ensuite travaillés, et dans ce cas alors, l'huile Murcott deviendrait un article commercial, les caractéristiques physiques et chimiques de l'huile pressée à l'aide de l'extracteur FMC-In-Line ont été déterminées. et présentées.

Fleurs de camomille

L'usage récent d'azulènes et de substances azulogéniques obtenus par l'huile volatile des fleurs ainsi que les extraits et les infusions de la drogue, dans des formules toniques spéciales, crémes pour cheveux, pâtes dentifrices, cosmétiques, schampooings, etc., est un autre exemple du renouveau d'intérêt porté par l'industrie des produits pharmaceutoques et des cosmétiques aux substances botaniques.

Pour être en bonne santé, il est vital pue la peau respire

Des méthodes pour déterminer la respiration de la peau ont été décrites. Pour appuyer la suggestion que la respiration de la peau est un critère de la santé de la peau, il a été démontré que quelques conditions pathologiques et l'action de certains agents toxiques sont caractérisés par une diminution de la respiration de la peau.

Copolymères de Vinyl dans les cosmos cosmétiques

Dans cette étude on décrit en général l'acétate polyvinyl, et tout particuliérement, un simple copolymère. On décrit sa dérivation et sa polymérisation, aussi bien que la préparation des copolymères d'acétate de vinyl, et leurs propriétés utiles à l'industrie des cosmétiques. Des données sont aussi présentées sur des produits pour fixer les cheveux, sur les propriétés aérosol et les essais de sécurité.

Inhalt

"Zugelassene Farmittel: Auftreten verschiedener Farben- und Farbstoff-probleme bei der Abänderung von Formeln."

Wenn bedeutende Abänderungen in der Aufstellung der Formel für gefärbte Erzeugnisse gemacht werden, wird es nötig, verschiedene Faktoren gegeneinander abzuwägen, besonders die physikalischen und chemischen Eigenschaften der einzusetzenden Farbmittel und/oder andere Bestandteile, Diese Faktoren: Versuchsformeln für die Farbstoffe sowie Hilfsmittel zur Farbenabstimmung werden erörtert; es werden neunundzwanzig Spektralkurven gezeigt.

Faktoren, die einen Einfluss auf die bräunende Wirkung von Dihydroxyazeton auf die Haut ausüben

Die durch Dihydroxyazeton auf der Haut hervorgerufene, rot-braune Farbe ist anscheinend eine unspezifische Protein Reaktion, die durch die direkte Kombination mit dem Keratin der Haut bewirkt wird. Die Farbe wird durch die Dicke der Haut, die Stärke der Lösungen und die Zahl der Anwendungen beinflusst.

Kalt ausgepresstes Florida Murcott Ol

In der Erwartung, dass die vermehrte Anpflanzung von Murcott eines Tages zur Verarbeitung von überschüssigen Früchten und Pflückobst führen und dass Murcott Ol dann ein Handelsartikel wird, hat man die physikalischen und chemischen Eigenschaften des Ols durch den FMC-In-Line Extraktor untersucht und das Resultat bekannt gegeben.

Kamillen Blüten

Ein weiteres Beispiel für das neu erwachte Interesse der pharmazeutischen und kosmetischen Industrie an botanischen Produkten ist die seit kurzem erfolgende Verwendung von Azulen und azulogenischen Stoffen, die aus dem flüchtigen Ol der Blüten gewonnen werden, sowie vom Extrakt und Aufguss der Droge—besonders in speziellen, tonischen Mitteln, in Haarkrem, Zahnkrem, kosmetischen Artikeln, Schampon, u,s,w.

Hautatmung ist für gute Gesundheit unbedingt notwendig

Methoden, um das Atmen der Haut zu messen, werden kurz baschrieben. Zur Bekräftigung der Annahme, dass die Hautatmung das Kennzeichen einer gesunden Haut ist, hat man gezeigt, dass ein Nachlassen der Hautatmung für einige pathologische Zustände und für die Wirkung gewisser Giftstoffe charakteristisch ist.

Vinyl Copolymer in der kosmetischen Welt

Diese Arbeit bespricht Polivinyl-Azetat im allgemeinen und ein spezielles Copolymer insbesondere. Es werden sowohl die Herleitung und die Polymerisierung wie auch die Herstellung von Vinyl-Azetat Copolymer und die für kosmetische Mittel nützlichen Eigenschaften beschrieben. Die Angaben beziehen sich auf zerstäubte Haarmittel, auf die Eigenschaften von Aerosol und aut Unschädlichkeits-Prüfungen.

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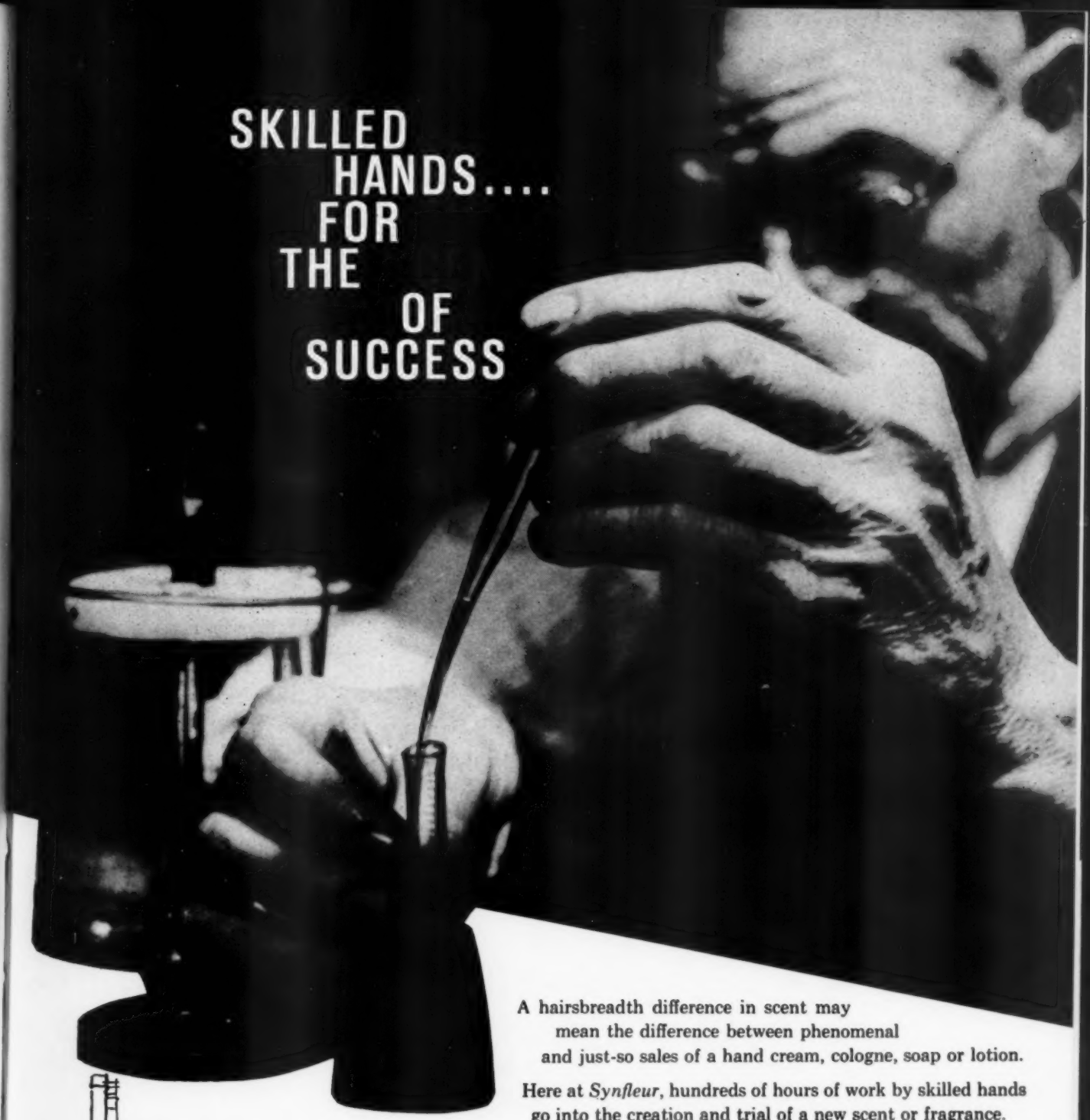

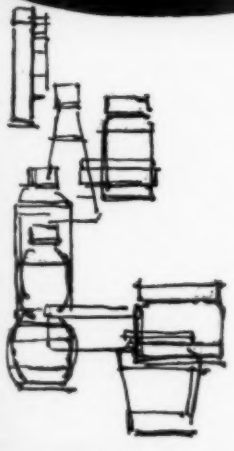

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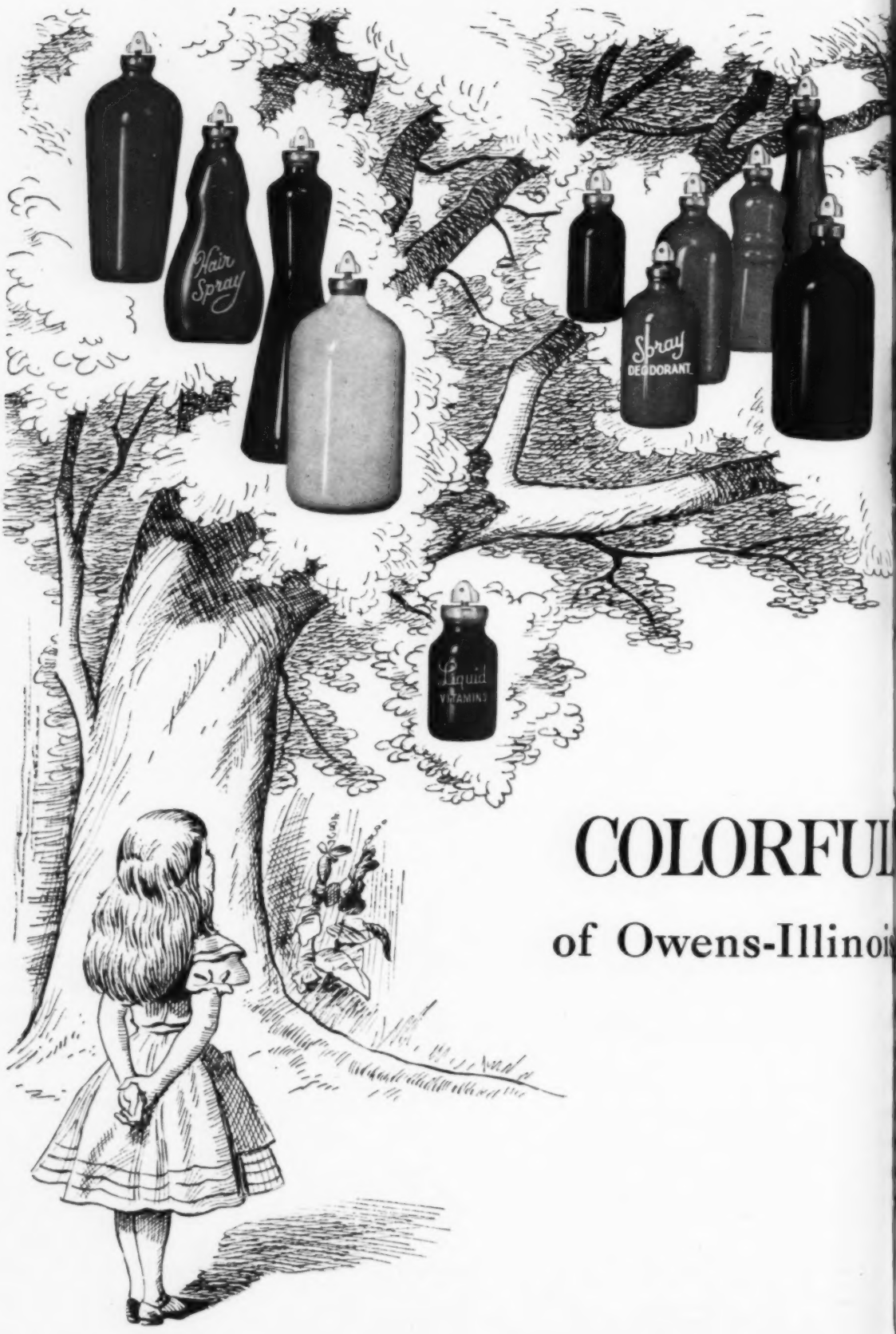

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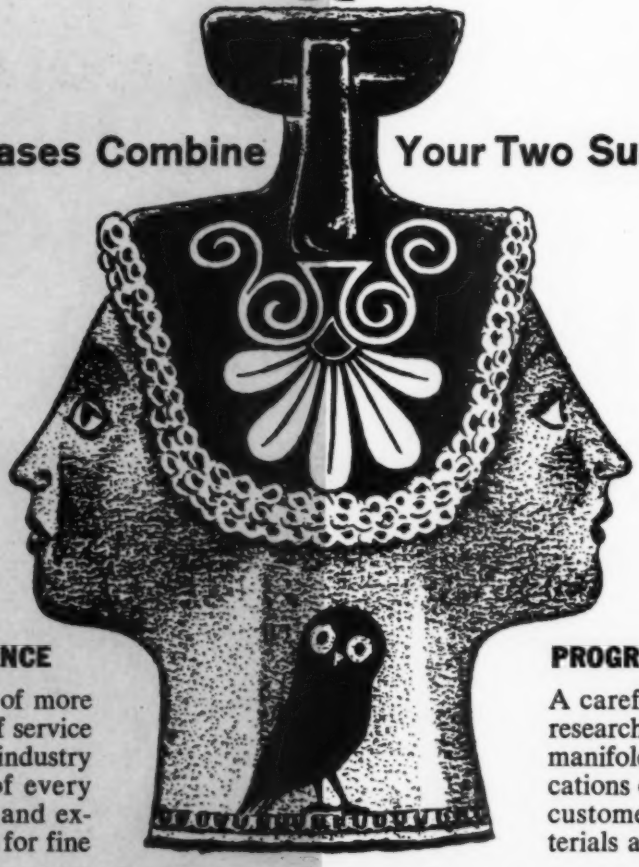

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Notes

Sitting in on a Wayne State University College of Pharmacy convocation recently, I heard David D. Stiles of Abbott Laboratories talk on the "Prescription Market—Yesterday, Today, Tomorrow." While the whole presentation was interesting, I found his statement that 60 per cent of all prescriptions filled in 1959 were $3.00 or less, while 75 per cent cost $4.00 or less . . . . . Up to now it has been possible to get ethoxylated lanolin of varying solubility in alcohol and water. Then came the ethoxylated lanolin alcohols. Now it is cholesterol, ethoxylated to give clear alcoholic and aqueous solutions. (Bill Griffin and I made one experimentally in the early 1940's, as I remember) . . . . . Food allergy can cause stomach and abdominal discomfort 24 hours after ingestion. Wonder how it affects simultaneous application of cosmetics otherwise nonallergenic or nonsensitizing? . . . . . German Patent No. 1,007,474, mentions the use of choline salts, such as citrate, tartrate and laurate in cosmetic creams and lotions . . . . . Alec Rimer (Dermacult, S.A.) of Johannesburg, South Africa, was in New York recently. Have been writing him for many years, and finally met in person . . . . . Did you know that ultraviolet absorbers can be used in "dead looking" tinted or make-up items to brighten the shade . . . . . If mink fat isn't rich enough for your product, try the Italian suggestion of marton or blue fox fat. (How about chinchilla fat?) . . . . . Looks like the lipstick business is off the hook for a while on lipstick colors . . . . . Have been surprised by the attitude of some Yankee companies operating abroad in insisting on exactly following formulas and procedures ending up in spoilage or poor quality, when local conditions indicate modifications. Indeed, in one case I saw a product shipped from the States already off-odor due to spoilage, on arrival in the foreign country . . . . . Don't think that sodium cetyl sulfate as an emulsifier is dead . . . . .

Cellulose Depolymerizer

A cellulose depolymerizing enzyme as been introduced commercially. It is said to be far more active than comparable European preparations (which are thought to be mixtures).

The new material has a wide potential. Internally it can be used to aid digestion for young and old alike. It should find use in foods as a cellulose "tenderizer."

In cosmetics one visualizes a number of possibilities such as degradation of gums for hair setting, reducing viscosity and increasing fluidity of "insoluble" gums or in face masks. Variations of these ideas could produce novel cosmetic effects.

Colors and Filtering

A comment in one of the European publications suggests the addition of color to any solution prior to filtration.

If it is done this way, the filter pads remove some of the colorant, which is particularly bad if the colorant is a mixture of soluble colors to effect a special tint.

If your coloring solution is filtered and found to be compatible with the formula, there is no reason why it can't be added after filtration and have a perfectly clear liquid. I know a number of people who do it this way and it works OK.

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cosmetic uses by precipitating a cationic surfactant with an anionic surfactant. The resulting precipitate may not be readily water soluble but a co-solvent, such as alcohol will do the trick.

Numerous examples are given in U. S. Patent No. 2,940,902 which will work.

Such thickeners are not affected by peroxide, acid or alkaline additions and it takes only a small amount to do the job.

Miss Rachel Heald discussed some of these and early patents in the April issue (1960) of the AMERICAN PERFUMER.

JAHRBUCH FUR DEN PRAKTIKER 1960, 352 pages. Verlag for Chem. Industrie H. Ziolkowsky K. G., Augsburg, Germany. Price 8.40 DM (app. $2.50).

The handy plastic covered yearbook contains eleven original articles and a host of miscellaneous data germane to the oil, fat and soap industries. Numerous tables, recipes and listings of cosmetic and perfumery materials are given.

The presentation is typical of yearbooks, but the size (4 x 6 inches) is unique.

While the data covers the industries mentioned above from an international viewpoint, its strength lies in German coverage and is printed in that language.—(M. G. deN)

CHEMISTRY MADE EASY. Cornelia T. and Foster Dee Snell, Chemical Publishing Co., Inc., New York 10, New York, 704 pages, 1959, Price $10.00.

The complex subject of Chemistry is arranged into its three main branches, general, inorganic and organic. The style is simple and easy to follow. Each main section of the book has its own index, which is a bit awkward.

Executives, salesmen and technicians will find the book useful in gaining a working knowledge of chemistry. Such subjects as ions, valence and pH are clearly explained and in considerable detail. The book is a must for non-technically trained people dealing in chemicals, or some facet of industry where chemistry is its mainstay. —(M. G. deN.)

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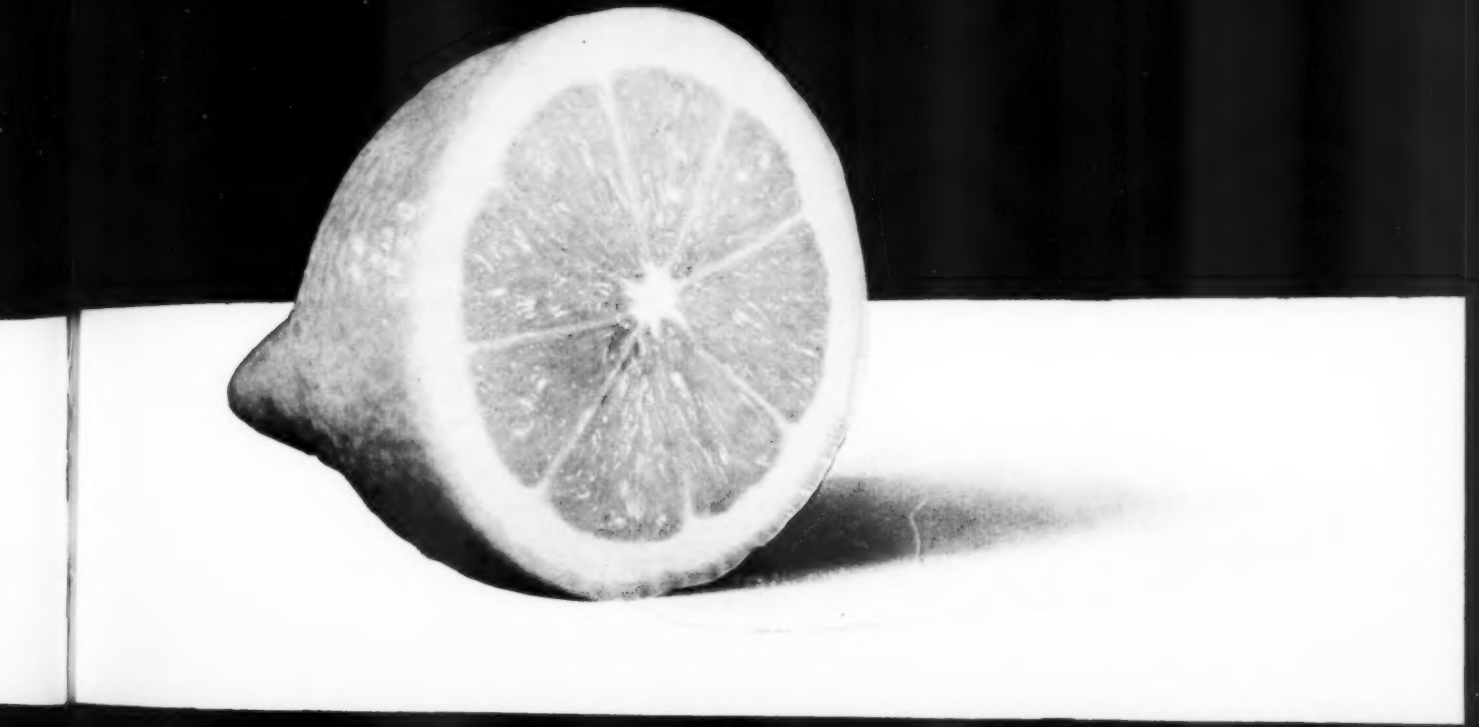

Note further details and suggestions from our data sheet.

Questions and Answers

Q. *We are interested in a hair preparation designed to restore natural color to hair that is going gray. We understand this product has been placed on the American market, and we are anxious to find out if you can supply such information as to the success of this product which is called "Formula 16." We are anxious to find out whether the product is widely distributed and enjoys reasonably satisfactory sales and whether the product does the job which the company claims. We would also like to know whether the product has been nationally advertised.*

A. We have seen a product in the American market called Grecian Formula Number 16 for the purpose of coloring hair. For obvious reasons we cannot attempt to analyze the product nor do we know its composition, and therefore, cannot comment on it one way or the other. However, color "restorers" are not new to the American market. Formulas for these will be found in many of the older books on cosmetic practice. In general they amount to about 1 per cent of lead acetate and colloidal sulfur up to 5% along with about 5 per cent of glycerol in a rose perfumed water solution. If you would like to try one of these to see if it gives you what you want, you can then make your own modifications.

Q. *We would be very grateful if you could give us the name and the address of the supplier of Lorothidol. A. M. F., Chile*

A. Lorothidol is known in the United States as bithional and is available from Monsanto Chemical Co., 800 North 12th Blvd., St. Louis 1, Missouri, and R. T. Vanderbilt Co., Inc., 230 Park Ave., New York 17, N. Y.

Q. *Do you know of an antidote for poison ivy and poison oak? We are interested in one that when mixed with benzyl benzoate will not neutralize the benzyl benzoate. C. O., Washington*

A. The only antidote for poison ivy that appears to be any good is immediate scrubbing with soap and water. The use of oxidizing agents and sometimes some of the zirconium salts such as carbonated hydrous zirconia, is said to be effective. Benzyl benzoate, on the other hand, would tend to solublize the oleo resin and in our opinion, would cause the poison ivy to penetrate more deeply and thereby become more aggravated. The only purpose that benzyl benzoate might serve is in the treatment of chiggers, and frankly, we do not see how the two preparations can be combined into one.

Q. *Would you please furnish us with a formula for an oil-in-water vanishing cream which would be compatible with the following ingredients: allantoin, DL-acetyl-methionine and water soluble vitamins? E. H., Ohio*

A. The following formula for an allantoin hand cream which is a vanishing cream can be adapted to include the DL-acetyl-methionine. Simply dissolve the methionine compound in water in which it is readily soluble.

	Percent by weight
Glyceryl monostearate, self-emulsifying	12.0
Spermaceti	6.0
Light mineral oil	1.0
Butyl para-hydroxybenzoate	0.2
H_2O	68.1
Glycerol	12.5
Allantoin	0.2
Perfume	0.4

Melt the glyceryl monostearate, spermaceti and mineral oil together, bring the temperature to 75°C. Dissolve the allantoin in the glycerol and water, bring to 75°C., mix the two phases, stirring until cool enough to take perfume, then cool to room temperature. NOTE: Combination of methyl, ethyl and butyl, para-hydroxybenzoate may be used as preservative.

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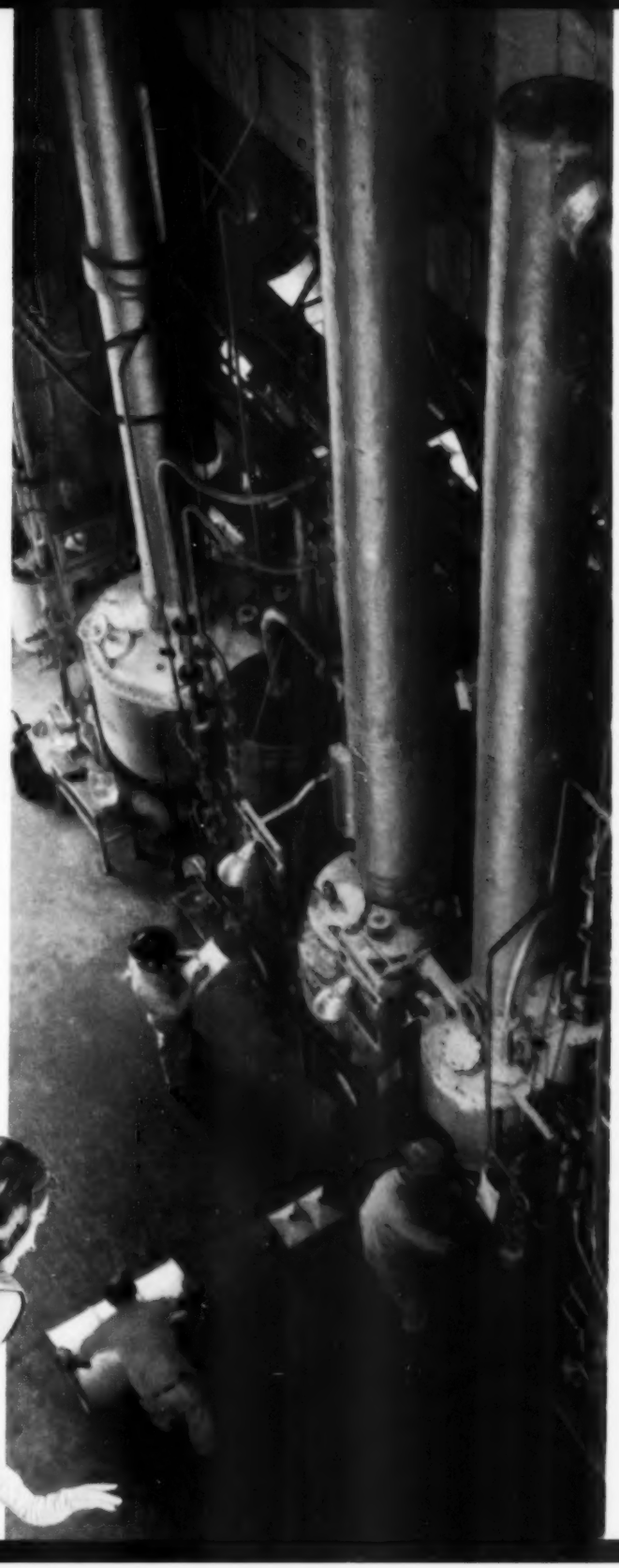

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Certified colorants; *some color and colorant problems met when revising formulae*

By William H. Peacock

Colorists in the cosmetic, drug and food fields in the United States usually must achieve their color effects by the judicious application of a limited number of "certified" colorants—that is, by using dyes and pigments that have been tested and approved for use by the Food and Drug Adminstration. This palette of coloring agents, legally permissible for their use in products offered for sale in this country, has been appreciably reduced within the last few years by action of that government bureau in delisting and/or reclassifying twenty-one of the dyes and pigments formerly on prior lists of certifiable colorants. (4)

Consequently, many of the older colorant formulae, those which contained one or more of these reclassified coloring agents, must now be revised. The present article is a discussion of some of the color and colorant problems met when making such formulation revisions. In addition, a number of formulae will be suggested that are potentially useful in getting certain specific color effects.

Physical and Chemical Properties.

When a colorant or mixture of colorants has to be replaced in a product with substitute coloring agents, formulation difficulties arise because of the need to balance both the physical and chemical properties of the substitute dyes or pigments. Probably no two coloring agents have identical properties. Colorants tend to differ in: absorbency for oils and other liquids, affinity, compatibility, dispersion, fastness to light, pH changes, reagents and storage; molecular weight, opacity or transparency (hiding power), particle size and particle size distribution, solubility, spectral transmittance and reflectance, stability, substantivity, texture and tinctorial strength. Consequently these variations must be discovered and resolved in formulation studies.(2,8,9,14)

Spectral Characteristics.

It is well known that dyes and pigments produce their color effects by modifying greatly the composition of the light reflected and transmitted by the products into which they are incorporated. Moreover, each colorant tends to produce a spectrophotometric reflectance and/or transmittance curve somewhat different, however slightly, from that produced by any other coloring agent. Often too, the spectral curve obtained with any one colorant or mixture of colorants tends to shift, to show variations in absorption maxima when differing media are used (polar versus non-polar solvents for example), or when viewed or tested under light from different sources, which may have quite different energy distributions (sunlight versus tungsten filament light, for instance), and with pH changes.

Actually, only when the spectral reflectance and transmittance curves produced by a substitute colorant formula are identical with those obtained with the original, replaced coloring agent is a color-match considered to be a "spectral" match,—a result rarely attained. In such cases the color comparisons will tend to appear alike even when viewed under different illuminants. Usually however, colorists can get only approximate, "metameric" color matches with substitute coloring agents,—that is, designed closely to approach the desired color effect under specified limited viewing conditions, for examples see Figures 2 and 4. (Incidentally, all of the spectral curves shown in Figures 2 to 8 inclusive are of the "color density" type, where $D = -\log \log \frac{1}{T}$. This type of curve is characteristic because the shape of the curve does not change with changes in the concentration of the dye solution, the curve is merely displaced vertically lower as the dye concentration increases and more and more of the light is absorbed.)

Spectrophotometric studies are helpful in color matching to the extent that they aid colorists in controlling the composition of the light signals that reach the viewing eye. These physical, radiant energy signals are converted to psychophysical stimuli and carried by the physiological optical system to the brain, at which point they produce a psychological perception or experience of color. (1,5,13).

Psychological Color Attributes.

Because of the largely unstandardized terminology of the science of color, it is well carefully to differentiate between the terms "color" and "colorant".(6) It is advisable to remember that although a so-called

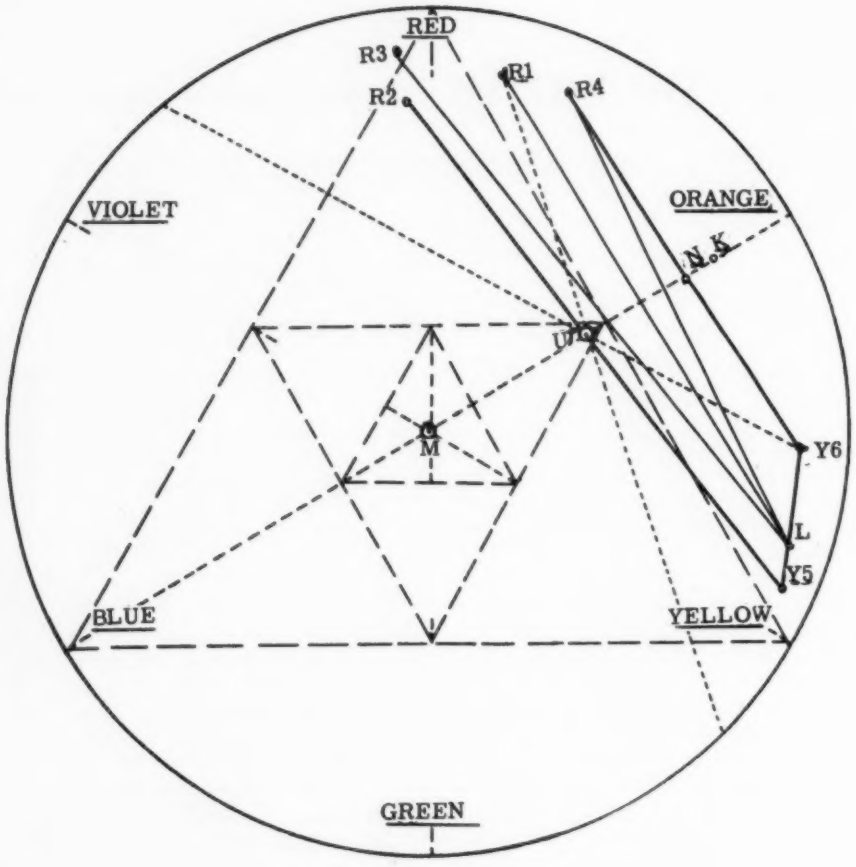
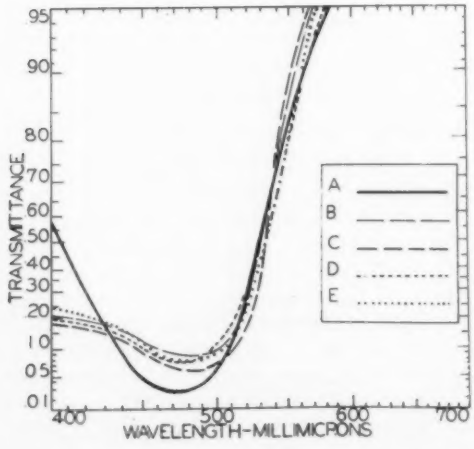


Figure 1—Hue orientation chart

Color-points: R1=FD&C Red No. 1, R2=FD&C Red No. 2, R3=FD&C Red No. 3, R4=FD&C Red No. 4, Y5=FD&C Yellow No. 5, Y6=FD&C Yellow No. 6, K=FD&C Orange No. 1, L=Mix of Y5 and Y6, M=Neutral Gray central point, N=Mix of R4 and Y6, U=Mix of R2 and Y5.

Figure 2—Spectral transmittance curves for FD&C Orange No. 1 and substitute colorant formulae

Curve A: FD&C Orange No. 1 at 20.0 milligrams per liter.
Curve B: Formula B, Table I, at 29.5 milligrams per liter.
Curve C: Formula C, Table I, at 30.0 milligrams per liter.
Curve D: Formula D, Table I, at 33.5 milligrams per liter.
Curve E: Formula E, Table I, at 22.0 milligrams per liter.



Note: All of the spectral transmittance curves shown in Figures 2 to 8 inclusive are of the color density type, $D = -\log \log \frac{1}{T}$, where D=optical density and T=transmittance. The curves were obtained using a modified General Electric Company type, recording spectrophotometer, with one centimeter cells, at room temperature, with solutions adjusted to the dye concentrations and pH conditions listed in Tables I, II and III.

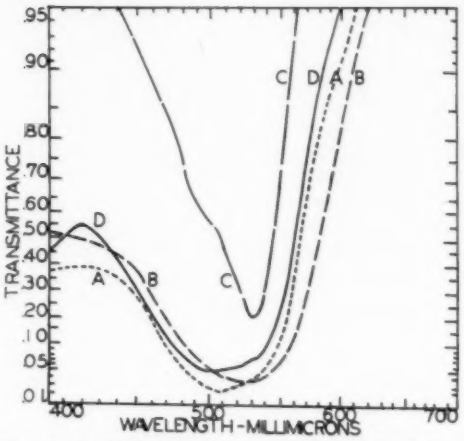


Figure 3—Special transmittance curves for four FD&C Reds.

Curve A: FD&C Red No. 1 at 40.0 milligrams per liter.
Curve B: FD&C Red No. 2 at 40.0 milligrams per liter.
Curve C: FD&C Red No. 3 at 7.5 milligrams per liter.
Curve D: FD&C Red No. 4 at 28.0 milligrams per liter.

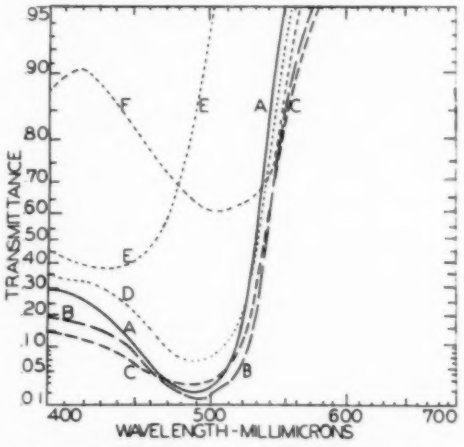


Figure 4—Spectral transmittance curves for the former D&C Orange No. 3 and No. 4 and substitute formula.

Curve A: D&C Orange No. 3* at 40.0 milligrams per liter.
Curve B: D&C Orange No. 4** at 30.0 milligrams per liter.
Curve C: Formula C, Table II, at 38.6 milligrams per liter.
Curve D: FD&C Yellow No. 6 at 24.0 milligrams per liter.
Curve E: FD&C Yellow No. 5 at 9.6 milligrams per liter.
Curve F: FD&C Red No. 4 at 5.0 milligrams per liter.

* Now listed as External D&C Orange No. 7.
**Now listed as External D&C Orange No. 8.

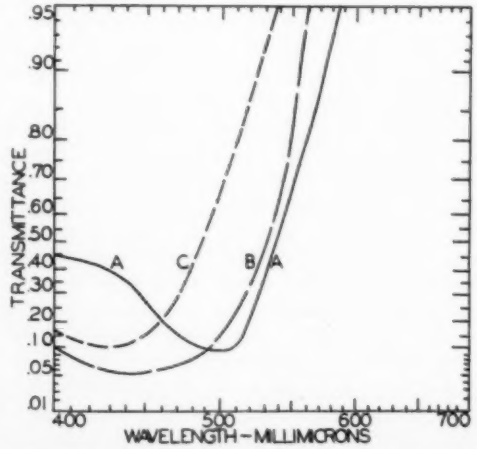


Figure 5—Spectral transmittance curves for colorant blends yielding "Red Orange", "Ade" and "Egg Yellow" effects.

Curve A: "Red Orange", Table III, at 23.75 milligrams/liter.
Curve B: "Ade", Table III, at 36.00 milligrams/liter.
Curve C: "Egg Yellow", Table III, at 22.05 milligrams/liter.

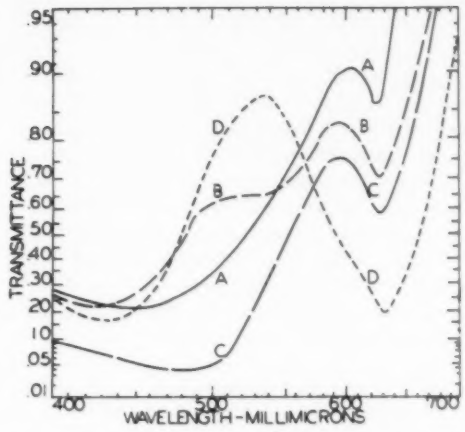


Figure 6—Spectral transmittance curves for colorant blends yielding "Caramel", "Cola", "Chocolate", "Leaf Green" effects.

Curve A: "Caramel", Table III, at 20.2 milligrams/liter.
Curve B: "Cola", Table III, at 20.0 milligrams/liter.
Curve C: "Chocolate", Table III, at 50.0 milligrams/liter.
Curve D: "Leaf Green", Table III, at 20.6 milligrams/liter.

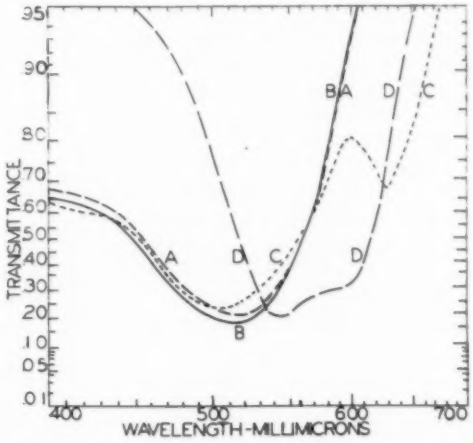


Figure 7—Spectral transmittance curves for colorant blends yielding "Strawberry", "Raspberry", "Wine" and "Violet" color effects.

Curve A: "Strawberry", Table III, at 20.00 milligrams/liter.
Curve B: "Raspberry", Table III, at 21.75 milligrams/liter.
Curve C: "Wine", Table III, at 20.75 milligrams/liter.
Curve D: "Violet", FD&C Violet No. 1 at 7.5 milligrams per liter.

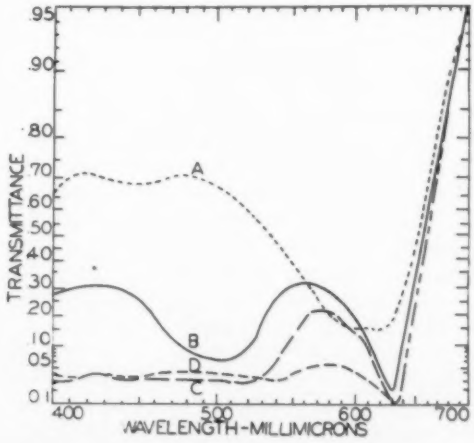


Figure 8—Spectral transmittance curves for colorant blends yielding "Navy" and "Black" color effects.

Curve A: "Dark Navy", D&C Black No. 1 at 10.0 milligrams/liter.
Curve B: "Black I", Table III, at 50.50 milligrams/liter.
Curve C: "Black II", Table III, at 81.00 milligrams/liter.
Curve D: "Black III", Table III, at 81.25 milligrams/liter.

"colored substance" may contain a light-signal modifier, that is, a *colorant*, the effect of *color*, produced when the modified light-signals reach and pass through the eye, exists only in the brain, and is a resultant, mental, psychological perception of the viewer. Some unfortunate individuals have sight, that is, they receive the modified light-signals from a colored product, yet are unable to interpret or perceive them as *color*. These persons are commonly called "completely or incompletely color-blind". (Consequently, some of them must indeed live in a gray, achromatic, hue-less world.) (5)

Psychologically, color has three principle attributes, namely: "hue", "value", and "saturation". (There are other "modes of appearance", including "brightness" or "brilliance".) (1,5) Because these properties largely determine the viewers' perception of color, the art of color-matching is the manipulation or the balancing of these attributes to induce a desired mental color effect or experience. These *color* perceptions are produced by controlling the light-signals, chiefly by the judicious application of *colorants*.

As previously noted, in making color matches colorists equipped with photometers can use them to determine the spectrophotometric properties of their colorants, and then may use these known data in studies to control the composition of the light-signals sent to the eye of the viewer. When such instruments are not available, however, direct viewing "cut and try" methods are used. It may be helpful therefore, to discuss briefly the relationship and manipulation of the "hue", "value", and "saturation" attributes. (1,5, 7,11,12)

As a discussion aid reference should be made to Figure 1. That figure is an hue-orientation plot consisting of a Maxwell-type hue-triangle inscribed in a circle. It is assumed to represent a cross-section of a color-solid taken at a medium high "value" level. This chart may be helpful in visualizing the relationship of colors in a special way analogous to the applications of the principles of the lever and the balanced resultant of forces in physics.(11)

For example, if two colorants be blended, each of which is assumed to be represented by a color-point on Figure 1 the color produced by the admixture would give a color-point falling somewhere along the straight line joining those color-points. Thus, in Figure 1 if the two color-points labelled respectively Y5 and Y6 be considered to represent the location in a color-solid, at this "value" level, of the yellow colors correspondingly produced by the dyes FD&C Yellow No. 5 and FD&C Yellow No. 6, then all the yellow colors producible by using mixtures of these two dyes will have corresponding color-points falling somewhere along the straight line joining Y5 and Y6, such as the point labelled L.

Similarly, if the red colors produced by the use of FD&C Red No. 2 and FD&C Red No. 4 be represented respectively by the color-points R2 and R4 in Figure 1, then a mixture of the bluish red FD&C Red No. 2 and the canary yellow FD&C Yellow No. 5 could be so proportioned that the color produced by the blended dyes would have a color-point falling along the line R2-Y5, as for instance to give that of a slightly dull orange, as at point U. In the same manner, a dye mixture of FD&C Yellow No. 6 (a reddish yellow) and FD&C Red No. 4 (a scarlet) could be proportioned to produce a color whose color-point would fall along the line R4-Y6, such as to yield the orange effect represented by the color-point N. Each of these two-colorant mixtures therefore are analogous to balanced weights or moments about levers with their respective fulcrums at the color-points U and N.

It is interesting and important to note that many colors represented by a color-point in Figure 1, often can be produced or closely approached by mixtures of colorants widely different in hue; it is only necessary that the lines joining the color-points of the colors produced by each ingredient of the mixture pass through the desired color-point. For example, the orange represented by the color-point U in Figure 1, could be matched, under specified viewing conditions, by using a great variety of colorant formulae. This feature could be visualized or illustrated by drawing straight lines in any direction through the color-point U. For instance, if a line be drawn from Y6 to U and then extended it will enter the portions of the chart representing the bluish red and red violet hue areas. This indicates that the orange represented by the color-point at U may be produced or matched by using mixtures of FD&C Yellow No. 6 in proper proportions with bluish red and/or reddish violet dyes, these latter dyes of course, in relatively small ratios.

In like manner, to illustrate another combination formula, a straight line drawn on the chart from R1 through point U would extend into the greenish yellow and very yellowish green hue areas, thereby indicating that the orange effect represented by the color-point U may be approached by using mixtures of FD&C Red No. 1 and greenish yellow or very yellowish green dyes in the proper ratios.

Also, it will be noted that the color-points U and N both lie in the diameter which passes from 'blue' through the center point M to 'orange'. This indicates that the addition of small proportions of a blue, slate, gray or yellow brown to the orange denoted by color-point N (from a mixture of FD&C Red No. 4-R4—and FD&C Yellow No. 6-Y6—) will dull or 'pull' that orange until it approaches or matches the color at color-point U. This tertiary blending process therefore, is analogous to the balanced resultant of forces in physics.

Saturation and Brightness.

In Figure 1, the central point M denotes a neutral gray, that is, it is located at the spot where the 'gray scale' axis of the color-solid rises through the plane ("value" level) depicted by the chart. This gray color is considered to be achromatic, hueless. (Geometrically the central point M is the common intersection of all the perpendiculars drawn from the apexes of each of the equilateral triangles shown.)

It follows, that the various radii from point M may be considered as the joining lines along which would fall the color-points of the "tones", that is, of mixtures of gray with the respective hues. For instance, the radius drawn from point M through the color-points U,N,K to 'orange' represents the line along which would fall the color-points corresponding to the "tones" produced by blends of gray and a certain

orange. Moreover, the relative amount of gray present in the mixtures would be progressively less the nearer the respective color-points approached the circumference. That is, the orange denoted by color-point N would contain slightly less gray than that represented by color-point U. This degree of 'departure from gray' is called the "saturation". Therefore, the orange corresponding to color-point N is considered to be more "saturated" than that designated by color-point U; and similarly that indicated by color-point K is more "saturated" than that at color-point N.

Inasmuch as the addition of gray to a hue tends to produce "tones", often called "broken" or "softened" colors, the degree of "saturation" also affects the degree of "brightness-due-to-saturation". That is, the greater the "saturation", the "brighter" the color.

In actual color matching practice these tone effects usually are but seldom achieved by using additions of gray or of black colorants, but rather by the application of blends of chromatic (hued) coloring agents of varying degrees of "saturation". For example, as previously mentioned, the orange represented in Figure 1 by the color-point N can be approached by a properly proportioned mixture of a scarlet (yellowish red) and a reddish yellow, as by a blend of FD&C Red No. 4 and FD&C Yellow No. 6. The less saturated and slightly duller orange denoted by the color-point U could be obtained, as noted above, by adding rather small ratios of blue, gray or yellow brown (tan) dyes to the mixture that produces the color at N. However it is better practice to obtain the less saturated effect by blending a bluish red and a greenish yellow colorant, for instance by using FD&C Red No. 2 and FD&C Yellow No. 5.

Similarly, oranges with saturation and brightness intermediate between those represented by color-points N and U could be obtained by using FD&C Red No. 4, FD&C Red No. 1 and/or FD&C Red No. 3, as additions to a mixture of FD&C Yellow No. 5 and FD&C Yellow No. 6, such as one that would produce the yellow denoted by the color-point L in Figure 1. This can be shown readily in that chart by letting the color-points R4, R1, and R3 represent respectively the three reds mentioned, and connecting each of these points with color-point L. The joining lines will be found to cross the radius M to 'orange' between points U and N, thus indicating their intermediate effects.

Moreover, if in that figure the color-point K be considered to represent the color obtained by using the straight orange dye formerly listed as FD&C Orange No. 1, its location nearer to the circumference denotes that it is slightly more saturated and slightly brighter than any of the colors produced by the blends of red and yellow dyes suggested above. It will be appreciated therefore, that when blends of such red and yellow dyes are used as formulation substitutes for the former FD&C Orange No. 1 the metameric color matches may vary somewhat in "hue", "saturation", "brightness-due-to-saturation" and even in "value". Such small differences in color can be assigned mathematical 'color difference units' by using various equations in which weighted factors are given to these psychological attributes and making comparisons with standard systems of "color order".(5,7)

Tinctorial Strength.

In addition to the phenomena of *color* just discussed, there is a physical property of *colorants* which is a very important factor in color matching, namely, the "tinctorial strength" of the dyes and pigments employed. This term is used to indicate the relative, quantitative potency or coloring effectiveness of coloring agents. Some writers call this property the "tinctorial value" in which cases care should be taken to differentiate this term for a physical relationship between *colorants* from that psychological attribute of *color* known as "value". The tinctorial strength determines the weight of a colorant required to obtain a desired color effect. For example, if a dye be admixed with its own weight of a colorless excipient the coloring potency of the dye will be reduced proportionally, that is, its "tinctorial strength" is but 50% relative to that of the original, concentrated dye. This same factor may apply as between one colorant and a substitute formula or matching coloring agent. Examples of such relationships will be found in Table I, where it is shown that the substitute colorant formulae are 20% to 40% weaker in "tinctorial strength" than the straight orange dye they replace. Tinctorial effectiveness, of course, may vary for different applications.

It follows, of course, that this factor of tinctorial strength is one of decisive economic importance because it determines the relative costs of a colorant versus that of any proposed replacement or substitute colorant formulae. This factor is therefore assayed routinely by control colorists when testing successive lots, or in comparing offerings from different suppliers.

Differences in the relative tinctorial strength of dyes and pigments probably arise from the fact that non-isomeric chemical compounds differ in molecular weight; in their ratios of "chromophoric" nucleii versus salt forming, solubilizing radicals; and the variations in the degree to which the colorant tends to modify light-signals at each wavelength. In any case, it is one more factor which must be balanced to obtain planned color effects by using colorants.

Suggested Substitute Colorant Formulae.

In 1944, the American Cyanamid Company published colorant formulae suggested to obtain such color effects as: Black, caramel, chocolate, cola, egg-yellow, leaf green, ade and reddish oranges, raspberry, strawberry and wine. (8) Most of those formulae probably were used in proprietary mixtures of suppliers here and abroad. Inasmuch as each of these formulae contained some proportion of a straight acid orange dye namely, the former FD&C Orange No. 1, they are no longer legally permissible in cosmetics, drugs and food for sale in the United States. New formulea must therefore be developed omitting that declassified orange dye. Several such replacement formulae will be found in Tables I, II, and III.

Substitutes for FD&C Orange No. 1.

As has been discussed previously it is often possible in many applications to approach the orange color effects given by the former FD&C Orange No. 1 by using mixtures of certified red and yellow acid dyes.

To this end, in Table I will be found formulae giving the relative proportions of each specific dye in blends to obtain metameric color-matches for that FD&C Orange No. 1.

As is perhaps to be expected, the spectral curves in Figure 2 for Formulae B,C,D, and E tend to intertwine about that for the former FD&C Orange No. 1, Curve A, for most of its length.

For reference purposes the spectral curves for the four red dyes used in these matches are shown in Figure 3: A= FD&C Red No. 1;B= FD&C Red No. 2;C= FD&C Red No. 3 and D= FD&C Red No. 4.

Inasmuch as these substitute formulae contain only dyes having FD&C classification the blends may be used in food as legally as in drugs and cosmetics. The Formulae B,C, and E in Table I are also blends of dyes having physical and chemical properties rather closely similar to those of the former FD&C Orange No. 1. For instance, these blends tend to yield about the same hue, a slightly reddish orange, but slightly less saturated and slightly duller. They are soluble in water glycols and glycol ethers; are very sparingly soluble in alcohols; are insoluble in many esters, ethers, fats, fatty acids, hydrocarbons, ketones, oils and waxes. They have affinity for proteins, particularly in acidic baths; have moderate to good fastness to light exposures; good resistance to dilute acids; moderate to poor resistance to strong alkalies; tend to be destroyed by both strong oxidizing and strong reducing agents; and have a tendency to form insoluble complexes with many metallic salts.

However, colorant Formula D in Table I contains FD&C Red No. 3, and as that red dye is fugitive to light exposure and tends to precipitate with strong acids, the use of this formula is recommended only under somewhat alkaline conditions and for applications where fastness to light is not a requirement. This combination appears slightly yellower in solutions than it does in reflection effects, as compared to the former FD&C Orange No. 1. In fact with any of these Table I blends the colorist should expect somewhat different hue effects and a little greater

TABLE I: Substitute Formulae for FD&C Orange No. 1.

Dyes	Formulae: (Parts per hundred) A	B	C	D	E
FD&C Orange No. 1	100	..	..	..	..
FD&C Yellow No. 5	..	30	30	27	24
FD&C Yellow No. 6	..	51	60	67	59
FD&C Red No. 1	..	19	..	..	..
FD&C Red No. 2	..	..	10	..	..
FD&C Red No. 3	..	..	..	6	..
FD&C Red No. 4	..	..	..	..	17
Color Comparisons:					
Transmittance*:	Standard	Close	Close	Yellower	Close
Reflectance**:	Standard	Very slightly redder	Very slightly redder	Slightly redder	Very slightly redder
Tinctorial Strength***:	100	65	80	60	70
Figure 2 Curve:	**A**	**B**	**C**	**D**	**E**
Concentration****:	20	29.5	30	33.5	22
pH of Test Solution:	5	5	5	9	5

NOTES:

* : Transmission comparisons in northern daylight, viewed through 1½ inch columns of test solutions adjusted to the pH noted and to compensate for tinctorial strength differences to approach 0.1% and 0.02% solutions of FD&C Orange No. 1.

** : Reflection comparisons in northern daylight, of dried, bond-paper dip-tests prepared using solutions adjusted to approach in tinctorial strength an 0.1% solution of FD&C Orange No. 1, at the pH noted.

*** : Tinctorial strength as estimated by transmission comparisons versus FD&C Orange No. 1 taken as 100%. (Reproducibility approximately ±10%)

****: Concentration in milligrams of dye per liter of water adjusted to the pH noted, of the solutions used to obtain the spectral curves shown in Figure 2, in one centimeter cells at room temperature.

TABLE II: A colorant mixture to replace the former D&C Orange No. 3 and D&C Orange No. 4.

Dyes	Formula: (Parts per hundred) A	B	C	D	E	F
D&C Orange No. 3*	100	..	..	..	..	..
D&C Orange No. 4**	..	100	..	..	..	..
FD&C Yellow No. 6	..	..	62	100	..	..
FD&C Yellow No. 5	..	..	25	..	100	..
FD&C Red No. 4	..	..	13	..	..	100
Tinctorial Strength***	100	133	103	..	..	..
Concentration****	40	30	38.6	24	9.6	5.0
Figure 4, Spectral Curve	A	B	C	D	E	F

NOTES

* —Now listed as External D&C Orange No. 7.

** —Now listed as External D&C Orange No. 8.

*** —Versus D&C Orange No. 3 taken as 100%.

****—Milligrams of dye used per liter of water at pH 5 to give the solutions from which the spectral curves in Figure 4 were made, (one centimeter cells).

difficulty in getting uniformity of color in some products than with the straight acid orange they replace.

Substitute Formula for D&C Oranges No. 3 and No. 4

Because the Food and Drug Administration now lists these two dyes respectively as External D&C Orange No. 7 and External D&C Orange No. 8, they no longer may be legally used in drugs nor cosmetics that may contact the mucous membrane in use, in products for the United States market. To replace these dyes, which both have a similar hue, a substitute colorant mixture is recommended, and will be found as Formula C in Table II. Inasmuch as this is a combination of dyes that still retain an FD&C rating, it is legally permissible for use to color food, as well as cosmetics and drugs.

This suggested mixture produces an orange that is close in hue, slightly less saturated and a little duller than the color obtained using the replaced, straight, acid orange dyes. In coloring effectiveness, the mixture closely approaches External D&C Orange No. 7 in tinctorial strength, but is 30% to 40% weaker in that respect than External D&C Orange No. 8. Its color effects are also slightly less fast to light exposures.

In most other physical and chemical properties this substitute colorant mixture is very similar to the replaced orange dyes, that is, it is soluble in water, glycerine, glycol, glycol ethers, and sparingly soluble in alcohols; is insoluble in many esters, ethers, fats, fatty acids, hydrocarbons, ketones, oils and waxes; has affinity for proteins in acidic baths, and moderate to poor resistance to strong alkalies, oxidizers and reducing agents; and tends to form insoluble complexes with many metallic salts.

In Figure 4 will be found the spectral transmission curves for these dyes.

Some Popular Color Effects.

In Table III will be found listed formulae for mixtures of dyes having FD&C ratings that can be used to obtain some popular color effects in cosmetics, drugs and food. These are suggested as replacements for those issued in 1944 by the American Cyanamid Company,(8) but are designed to omit their use of the reclassified acid orange dye formerly listed as FD&C Orange No. 1. The respective "color-density" spectral curves obtained using these newer formulae are shown in Figures 5,6,7,8.

These colorant mixtures are soluble in water, glycerine, glycols, glycol ethers and moderately to poorly soluble in alcohol; tend to be insoluble in many esters, ethers, fats, fatty acids, hydrocarbons, many ketones, oils, and waxes. They have affinity for proteins in acidic baths; are moderately fast to light exposures, except those containing large proportions of blue, green or violet dyes, which have poor fastness to light; are resistant to weak acids and withstand dilute alkalies for short periods; tend to be anti-oxidants inasmuch as they are bleached by oxidizers; tend to be discharged (decolorized) by strong reducing agents; and form water-insoluble complexes with many metallic salts.

Dye mixtures of this type frequently are marketed as proprietary blends, often admixed with 50% or more of colorless excipients to reduce their tinctorial strength. The tinctorially weakening action of the excipients means that larger portions of the mixtures must be used, a feature that may help to minimize weighing errors.

Batch To Batch Colorant Variations.

The colorant formulae recommended in Tables I, II,III, should be considered only as guide formulae, the use of which should aid colorists closely to approach the various color effects named. The suggested mixtures were developed using certified lots of dyes and are probably accurate only for those specific batches. This is considered probable because dyes (and

TABLE III: Colorant mixtures that produce some popular color effects.

Dyes	Red Orange	Ade	Egg Yellow	Caramel
FD&C Yellow No. 5	..	56	91	49
FD&C Yellow No. 6	76	35	8	20
FD&C Red No. 2	24	..	..	26
FD&C Red No. 4	..	9	1	..
FD&C Blue No. 1	..	..	..	5
Concentration*	23.75	36	22.05	20.2
Figure 5, Spectral Curve	A	B	C	..
Figure 6, Spectral Curve	..	..	..	A

Dyes	Cola	Chocolate	Leaf Green
FD&C Yellow No. 5	65	27	67.0
FD&C Yellow No. 6	..	36	9.0
FD&C Red No. 2	30	30	..
FD&C Red No. 1	..	..	2.5
FD&C Blue No. 1	5	7	..
FD&C Green No. 2	..	..	21.5
Concentration*	20	50	20.6
Figure 6, Spectral Curve	B	C	D

Dyes	Strawberry	Raspberry	Wine	Violet
FD&C Red No. 2	86	76	58	..
FD&C Yellow No. 6	14	24	30	..
FD&C Blue No. 1	..	..	12	..
FD&C Violet No. 1	..	..	..	100
Concentration*	20	21.75	20.75	7.5
Figure 7, Spectural Curve	A	B	C	D

Dyes	Dark Navy**	Black I	Black II	Black III
FD&C Red No. 2	..	26	16	21
FD&C Yellow No. 6	..	30	..	16
FD&C Blue No. 1	..	44	31	31
FD&C Violet No. 1	..	..	..	9
FD&C Red No. 4	..	..	26	..
FD&C Yellow No. 5	..	..	27	23
D&C Black No. 1**	100	..	..	..
Concentration*	10	50.5	81	81.25
Figure 8, Spectral Curve	A	B	C	D

* —Concentration in milligrams per liter in water at pH 5 of the solutions used to obtain the spectral curves.

**—Note that this formula for Dark Navy is the only one in this Table III that includes a dye with D&C rating; all the other dyes listed have FD&C status.

By reference to Figure 8 it will be noted that the formula for Black II gives a spectral curve which is fairly flat in the 400-525 millimicron range, (Curve C), and similarly that for Black III, (Curve D), is fairly flat in the 400-620 millimicron range.

These various dye mixtures vary from 4% to 20% weaker in tinctorial strength than the corresponding older formulae to be found in the American Cyanamid Company publication, (8). This probably is associated with the fact that those formulae contained some proportion of the former FD&C Orange No. 1, which dye has a relatively low molecular weight and high tinctorial strength.

pigments) tend to vary slightly from batch to batch in hue, tinctorial strength, and in such features as crystallinity, ease of solution and/or dispersion, and the mechanical uniformity of proprietary mixtures. In actual practice therefore, experienced control colorists will anticipate a need to make slight adjustments in these formulae.

Pilot Lot Trials.

Colorists are well advised to make trial runs of revised and new colorant formulae, preferably in the complete prescription and shipping or dispensing container. The color results should be judged and other physical and chemical properties assayed in the product in the final, marketable form. This practical procedure of checking coloring results, in the specific products, is necessitated chiefly by the fact that color effects may vary considerably when viewed from different angles of sighting; or through columns of varying lengths; or through films that differ or are of uneven thickness (dichromatic effects); and under changing physical and chemical conditions.

For example, a colored product may appear differently viewed from various sighting angles because the ratio of transmitted to reflected light received by the eye may change at each angle. Again, a colorant formulation developed largely from transmittance data of solutions may be less satisfactory in products where reflectance characteristic are more determinate, as in tablets, opalescent emulsions and capsules.

Frequently too, some colorants will be found, such as FD&C Red No. 2, and particularly those having more than one transmittance or reflectance peak in their spectral curves, that change in color especially in hue when the dye concentration is increased or decreased greatly, or with changes in column length and/or film thickness. For instance, such dichromatic effects may appear when a bottled, colored liquid is viewed through the front, side and neck of the container, either when the bottle is full or at the diminishing liquid levels reached during use. A typical, well-known example of these effects is the fact that solutions of FD&C Red No. 2 may appear bluish red, scarlet or a very reddish orange in color depending on the dye concentration or length of the light path through the solution.(8)

Storage Tests.

Trial runs with revised colorant formulae are advisable not only for the spectral considerations aforementioned but also because many products are potentially chemically reactive, and physical changes may occur. For example, the pH of a product may change in storage, (such as the increase in alkalinity in some soaps on aging, for example); sugars and other ingredients may have a slow or delayed reducing and antioxidant effect; perfumes, preservatives and other additives may slowly affect enzematic or other changing reactions; the gradual evaporation of highly volatile liquids may change the concentration not only of the soluble coloring agents, but of all the ingredients, and this action, together with temperature changes, (room temperature versus refrigeration) may induce solubility and/or coagulant results and crystal growth with one or more of the colorants: while the photochemical action of exposure to light or sterilizing radiations may produce either slightly more easily or less easily discernible hue changes with the revised colorants.

Fastness and spectral properties should be carefully re-checked not only when a colorant change is made, but also whenever any major variation is made in any other or proportion of ingredients in a product; particularly when a new ratio of mixed solvents, new additives or materials from new suppliers are used. For instance, a change in a solvent may produce a shift in the spectral absorption maxima in addition to any influence on the solubility or dispersion features. Again, almost any change in ingredients may affect stability and other fastness factors.

It follows, of course, that like any other change in prescription ingredients, substitute colorants may not prove to be exact and trouble free replacements for older formulae. Nevertheless, experienced colorists by making separate studies of each application frequently can achieve metameric color-matches, particularly when acid dyes may be used. Usually such formulations are designed to produce some desired color effect only under closely controlled specifications of the specific colorants, their proportions and concentration, under standardized viewing conditions, and in a specific product and container.

Acknowledgement.

Grateful acknowledgement is made of the assistance received in the preparation of this paper from Messers. E. I. Stearns, P. A. Woerner, N. A. Cantore, A. F. Salerno and Raymond Nemeth of the Dyes Application Laboratory, Organic Chemical Division, American Cyanamid Company.

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Factors influencing the tanning effect of dihydroxyacetone on the skin

By Nelson Kanas, John Buchter and Fred J. Bandelin
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The use of dihydroxyacetone in the cosmetic field depends upon the fairly recent discovery that it imparts a brown stain when applied to the skin. This stain generally has the reddish-brown appearance of sunburned skin. The nature of the reaction is not definitely known but it is presumed to be a reaction product of dihydroxyacetone with the keratin of the skin giving a color similar to that of normal melanin, which is formed from tyrosine by a sequence of oxidative reactions.

The stain on the skin does not appear until three to six hours after application and herein lies one of the difficulties of use, namely, it is not known what has been accomplished until a number of hours after it is done. At this point it is too late to undo it.

Since we are dealing with the integument of the body in this reaction, it is necessary to consider its composition and structure. The epidermis, which is specifically involved may be considered to be composed of four layers. These layers are (1) the horny layer or the stratum corneum, which consists of dead scales of keratinized material; (2) the stratum lucidum, whose cells contain eleidin, which is formed during the process of keratinization; (3) the stratum granulosum, in which layer the epithelial cells die and keratohyalin appears; (4) the stratum germinativum, which is adjacent to the derma or corium. The cells of the outer or first layer are constantly being shed (desquamated) and are replaced constantly by cells from the deeper layers of the epidermia.

The color of the skin depends on the pigment granules (melanin) in the basal cells of the fourth layer.

The dermis (arterioles, capillaries and venules) also plays an important part in giving the skin its color. Through the translucent layers of epidermis the color of the blood contributes to the color of the skin. Depending upon conditions, blood in this area may impart a reddish, pinkish or bluish cast to the skin.

Since keratin exists in the first and second layers, reaction with dihydroxyacetone undoubtedly occurs here and thus covers the natural coloring of the skin which exists in the fourth layer.

Exposure to sunlight causes an increase in the amount of melanin deposited in the epidermis with the resulting reddish-brown color. Accordingly this can also be covered, to some extent, by the dihydroxyacetone reaction.

Effect of skin thickness on dihydroxyacetone reaction

Since it is known that the epidermis varies in thickness over various parts of the body and layers of epidermis containing keratin are thicker in calloused areas, these areas react to a greater extent than places where the skin is thinner.

This is especially notable in the palm of the hand. It has been noted also that other proliferations of the epidermis, such as warts show marked reaction. Scar tissue does not react to the extent that normal skin does and as a result shows up much lighter in color. Certain scaling skin diseases also reveal much lighter areas delineating the affected parts.

Effect on nails and hair

Although nails, hair and skin are all made up of albuminoid proteins loosely termed keratins, nails and hair do not react as readily as does skin. While concentrations of dihydroxyacetone of 5 to 10 per cent do not readily react with the nails, repeated applications produce a faint but noticeable reaction. Strong solutions (70-90 per cent) however, usually produce some reaction with a single application. Blonde hair is noticeably affected by the reaction and darkening may be observed with several applications of 5 per cent solution. The effect seems to be variable and affects hair of certain individuals more readily than others. This may, of course, be dependent upon the amount of natural oil on the hair. The reaction is difficult to observe on brunette hair but is readily discernible with altered brunette hair in those who prefer to be blondes.

This paper was presented at the convention of the American Pharmaceutical Association, August, 1960

Effect of repeated application to the skin

The repeated application of dihydroxyacetone to the skin produces darkening with each application to a point.

Although there are individual differences in the depth of color produced in various persons, it is not possible, even with repeated applications, to get a reddish-brown deeper than the usual dark suntan. It is questionable if darkening to the extent produced in dark-skinned persons can be produced by dihydroxyacetone.

Effect of concentrations

As might be suspected, increasing concentration gives increasing color reaction. This may be illustrated by placing small paper squares dipped in various concentrations of dihydroxyacetone in water and applied to the skin for a definite, uniform length of time. This technique will also demonstrate the difference in individual response to application of dihydroxyacetone in rate of reaction and amount of color produced.

Color produced with sweat

Secretion of amino acids and possibly other small nitrogenous molecules react with dihydroxyacetone to produce the characteristic color. This can be demonstrated by pressing the perspiring palm of the hand upon a filter pad which has previously been impregnated with dihydroxyacetone solution and dried. After 12 to 24 hours, when sufficient perspiration is secreted, a hand print can be demonstrated.

Effect of vehicles, solvents, pH and surfactants on the tanning reaction

Solutions and emulsion-base lotions containing 5 per cent dihydroxyacetone were prepared and the pH values adusted to 4.5, 6.0, 7.0 and 8.5.

These were applied to the planar surface of the arm by saturating strips of filter paper with them and placing on the skin for a period of 10 minutes. The paper strips were then removed and the excess liquid absorbed with a paper towel. Results were noted after 8 to 12 hours. Lower pH values produced greater tanning. The reaction was less pronounced with increasing pH values. A pH of 7.0 gave a reduced but noticeable result. At pH levels higher than 8.0, no tanning effect could be produced. This was not due to loss or deterioration of the dihydroxyacetone since on acidification, these liquids again gave a tanning effect.

Since the skin is usually difficult to wet because of the natural oil secreted by the sebaceous glands, it is for this reason aqueous solutions do not give the intensity of reaction as do solutions containing solvents for these oils. Hydroalcoholic solutions therefore produce more intense and more uniform reactions than do aqueous solutions. Glycerine and glycols generally retard the reaction. This may be due to competitive affinity of the polyhydroxy compound and dihydroxyacetone for the keratinous tissue.

Surfactants which included several cationic, anionic and nonionic compounds were evaluated in aqueous solutions of dihydroxyacetone. Cationic and anionic compounds facilitated the reaction, probably by wetting the skin and allowing more intimate contact of the dihydroxyacetone.

Emulsified vehicles generally gave good results. Since most of these are soaps, having a low surface tension and have a relatively higher viscosity than aqueous or hydroalcoholic solutions, they wet the skin well.

This wetting is facilitated by rubbing into the skin. Because of their nature, these emulsified lotions or creams can be used on the skin in greater volume than most solutions and therefore deposit more dihydroxyacetone. One interesting fact noted was that the inclusion of the amino acid glycine seemed to increase the tanning effect. However, this caused rapid and progressive discoloration of all solutions through its reaction with dihydroxyacetone.

In our work we have not been able to stain the mucous membranes of the mouth or the gingival tissues. Staining of the teeth with dihydroxyacetone however, has been reported.[1] The tanned skin produced by reaction with dihydroxyacetone does not protect against sunburn and may, in fact, increase the erythema by increased absorption of ultraviolet rays due to the darker surface.

Summary

The reddish-brown color produced by dihydroxyacetone with the skin is apparently a non-specific protein reaction caused by direct combination of dihydroxyacetone with the keratin of the skin. The color is affected by skin thickness; a deeper color bein produced in areas of proliferated epidermis such as callouses and warts. Hair and nails are not as easily colored as skin. Stronger solutions and repeated applications, however, bring about typical color changes.

Repeated applications of dihydroxyacetone cause progressive darkening of the skin until a point is reached beyond which no further darkening takes place. This ultimate color varies with individuals. Skin of blonde, thin-skinned individuals generally does not darken as much as thicker-skinned, darker individuals. Certain persons of both types seem to resist coloration more than others. Response from person to person is variable. Higher concentrations of dihydroxyacetone produce greater color formation. The same deep color may be achieved by repeated applications of weaker solutions.

Sweat produces the typical color reaction. This is probably due to amino acids and other nitrogenous compounds secreted in sweat.

Alcohols and surfactants increase the rate of reaction. Isopropanol appears superior to ethanol. The reaction is more with decreasing pH values. Solutions and lotions having a pH value over 8.0 give no color reaction. Glycerine and glycols inhibit color reaction.

Emulsified vehicles having an acidic reaction seem to give best results.

The mucous membrane of the mouth apparently cannot be stained with the compound.

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Florida coldpressed murcott oil

By J. W. Kesterson and R. Hendrickson
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During recent years a number of groves have been planted in Florida with the Murcott (4, 6) which is sometimes referred to as the Smith tangerine or Murcott Honey Orange. This fruit has found favor with the fresh fruit industry and is becoming more important as a specialty item. In anticipation that increased plantings may some day result in the utilization of surplus and cull fruit for processing, in which event Murcott oil would become an article of commerce, the physical and chemical properties of the oil are presented.

Experimental samples

Coldpressed Murcott oil samples were prepared at the Citrus Experiment Station pilot plant by using an FMC In-Line extractor and auxiliary equipment as previously described (3). Sample No. 1 was prepared form 23 boxes of Murcotts grown on sour orange rootstock while sample No. 2 was prepared from 30 boxes of Murcotts grown on rough lemon rootstock. Dancy tangerine is a commercial sample of FMC In-Line extractor oil.

Method of analyses

The values for refractive index, optical rotation, specific gravity, aldehyde content and evaporation residue were determined in accordance with the procedures given by Guenther (2). Uutraviolet absorption data were secured in accordance with the procedure of Sale et al (5), while the infrared absorption data were obtained on each oil without dilution in a sodium chloride cell of 0.0139 mm thickness by using a Beckman IR-4B spectrophotometer.

Gas chromatographic data were secured using an Aerograph A-100-C with a Brown recorder. The parameters for this study were as follows. 2 μl sample, 40 cc/min gas flow, temp. 140°C., filament current 150 ma, range 1 mv, helium as carrier gas, diethyleneglycol succinate DEGS as stationary phase, column length 5 feet and a chart speed of 20 in/hr.

Discussion of results

The physical and chemical properties of the two pure samples of coldpressed Murcott oil are presented in Tables 1 and 2. It is evident that these oils are identical for all practical purposes. Although the aldehyde content was slightly higher in one sample there is no reason to believe that rootstock has an important influence on oil quality. The physical and chemical characteristics meet those of the United States Pharmacopoeia for orange oil, but the CD and peak absorption values are more similar to those for tangerine oil. Organoleptically Murcott oil differs somewhat from normal orange oil and has a tangerine character.

Essential oils from plants of different genera normally give very distinct infrared and chromatographic "trace-patterns" and in many cases it is possible to distinguish between oil from different species of the same genus. Since these trace-patterns are invaluable aids to experienced workers for identification, these data are presented in Figs. 1 and 2.

Table 1. Physical and Chemical Characteristics of Coldpressed Murcott Oil

	Murcott No. 1	Murcott No. 2
Sp. grav. 25° C./25° C.	0.8442	0.8441
Ref. Ind. n_D^{20}	1.4737	1.4737
Ref. Ind. 10% dist. n_D^{20}	1.4721	1.4721
Difference	0.0016	0.0016
Opt. rot. a_D^{25}	+96.48	+96.48
Opt. rot. 10% dist. a_D^{25}	+97.76	+98.40
Difference	+ 1.28	+ 1.92
Aldehyde Content—%	1.26	1.09
Evaporation residue—%	3.37	3.26

Table 2. Spectrophotometric Analysis of Coldpressed Mucrott Oil in Ultraviolet

	U. V. Spectrum Mu log E $\frac{0.25\ g}{100\ ml}$		
Sample	CD	Peak	Mu
Murcott No. 1	0.152	0.980	270.0
	0.540	1.020	327.5
Murcott No. 2	0.163	1.000	270.0
	0.532	1.040	327.5

This paper is Florida Agricultural Experiment Stations Journal Series, No. 1099

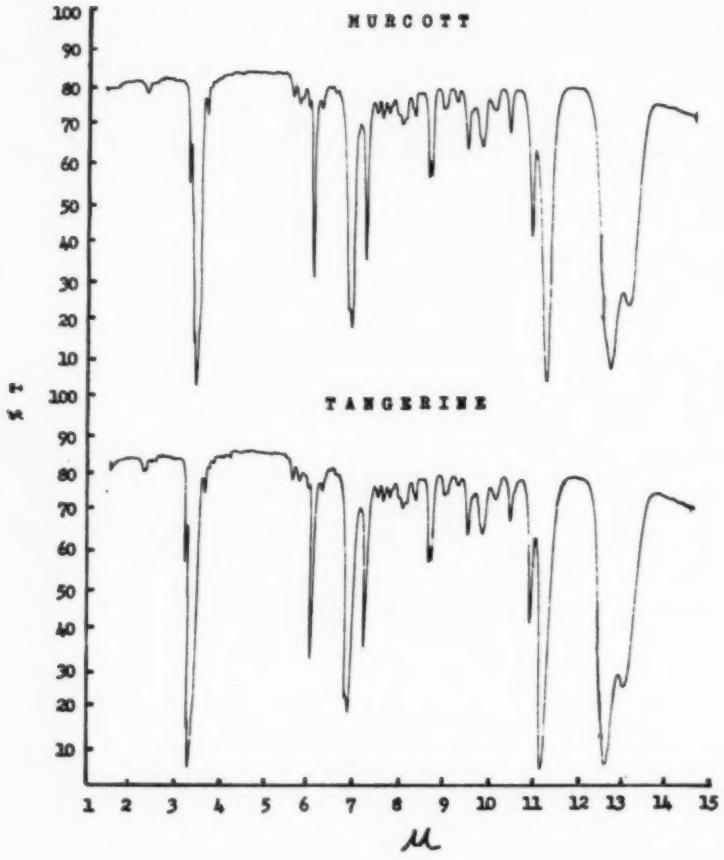

Fig. 1. Typical infrared curves for coldpressed Murcott and Dancy tangerine oil.

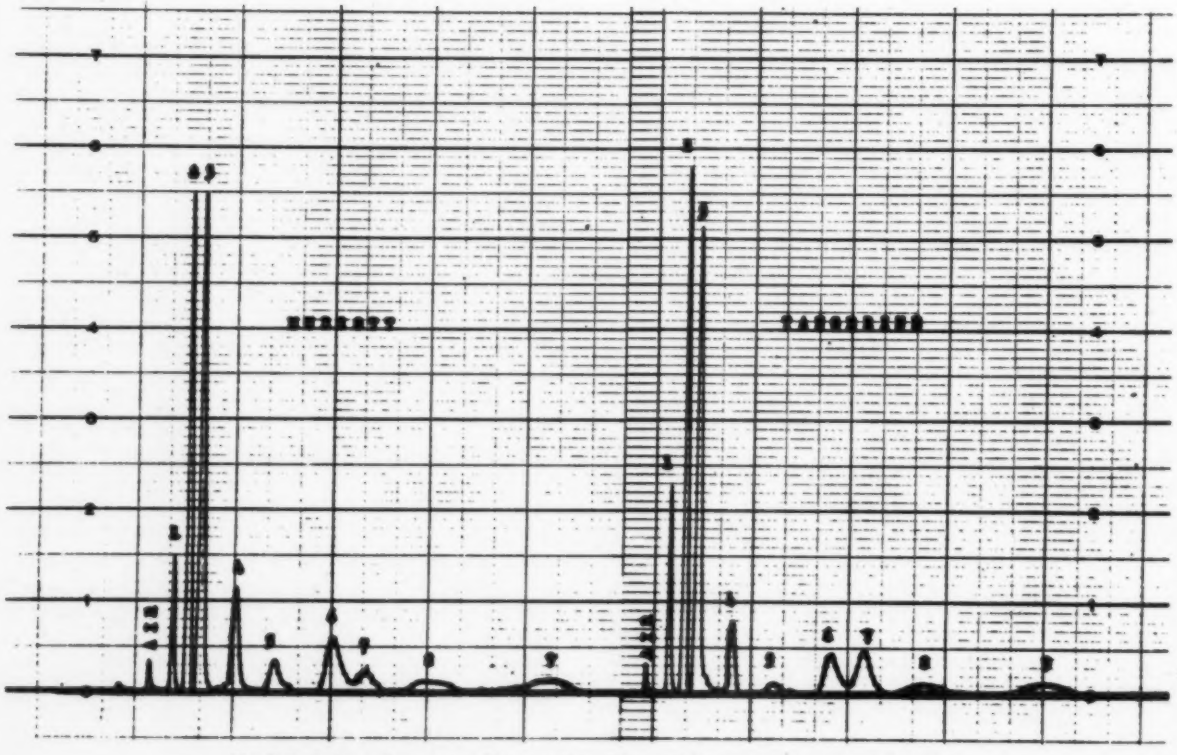

Fig. 2. Typical gas chromatographic curves for coldpressed Murcott and Dancy tangerine oil.

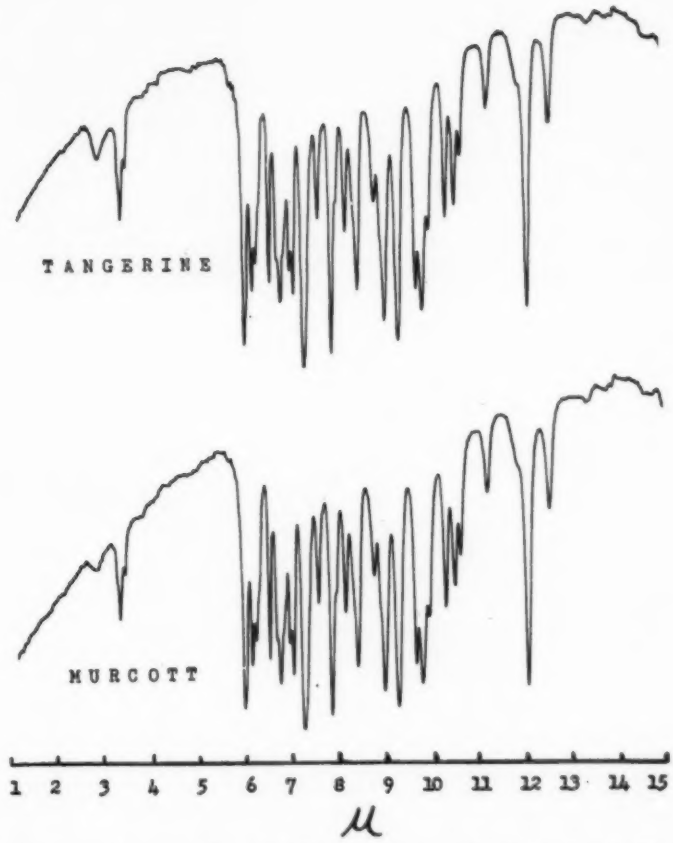

Fig. 3. Infrared spectrophotometric curves to establish the identity of tangeretin in cold-pressed Murcott oil.

When compared to curves representing tangerine oil, the infrared curves show identical absorption areas while the gas chromatographic traces show that the detectable components are in the same definite positions. The approximate relative concentrations of these components are shown by their peak heights at the following sensitivity adjustments: (X1) for peaks 4, 5, 6, 7, 8, 9; (X2) for peaks 1, 2 and Air; (X64) for peak 3. In Murcott the relative peak heights for components 6 and 7 show different concentrations; whereas, in tangerine peaks 6 and 7 are in equal concentrations. There appeared to be a greater concentration of components 4, 5, and 6 in Murcott oil while components 1 and 7 were more abundant in tangerine oil. This probably accounts for the difference in flavor and aroma, since both have definite mandarin characteristics.

On standing in a refrigerator a yellow precipitate formed in the oil. This precipitate was removed from the oil by filtration and washed with petroleum ether to remove excess oil and wax. It was then recrystallized three times from alcohol. A very fine crystalline substance with a pale yellow tinge resulted. This product melted at 153.2°C. (uncor.) and the mixed melting point with a known sample of tangeretin (154°C.) was 153.8°C. (uncor.). A rectangular potassium bromide pellet was prepared for infrared analysis according to the procedure of Edwards (1) as follows: 2 mg of sample was mixed with 200 mg of infrared quality potassium bromide and ground in carbon tetrachloride and evaporated to dryness. (This is essential to give a uniform crystal—since a decrease in crystal size will give increased absorption.) The powder was then pressed into a 25 mm. X 6 mm. pellet at 16,000 lbs. of hydraulic pressure for 5 minutes. The infrared curve for a known sample of 100 percent tangeretin (Fig. 3) when superimposed with the unknown gave identical absorption areas. This further characterizes the precipitate from Murcott oil as tangeretin and gives additional proof that Murcott oil is more typically tangerine in character.

Summary

The chemical and physical characteristics of cold-pressed Murcott oil expressed by the FMC-In-Line extractor have been determined and presented. These data show Murcott oil to have characteristics similar to those for tangerine oil.

Acknowlegements

Grateful acknowledgement is made to Mr. G. J. Edwards for the infrared and ultraviolet analyses.

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On the left is Hungarian Chamomile, Matricaria chamomilla, and on the right Roman Chamomile, Anthemis nobilis.

Chamomile flowers

By George Meer, Jr. and William A. Meer, Ph.D.
Meer Corporation

Although the tea made from chamomile flowers, *Matricaria chamomilla* L. has enjoyed a reputation as a cure-all for many years, particularly in Europe, it is only relatively recently that its wide range of usefulness has been documented in the literature. The systematic approach has revived a great deal of interest in this important botanical, and these studies have also led to the incorporation of the active ingredients of chamomile, namely the azulenes, in many pharmaceutical and cosmetic preparations.

This paper will briefly describe some of the recent pharmacological work, the types of chamomile flowers available commercially, as well as some of the chemistry of its constituents.

Pharmacology

The major pharmacological properties of chamomile are said to be anti-inflammatory and granulation promoting or reparative. In the past it has been used in chronic gastritis, spasms of the stomach and intestinal tract, diarrhea, as well as inflammation of human skin and mucous membranes. It has also been recommended for the treatment of colitis, eczemas, urticaria, rheumatoids, bronchial asthma as well as asthma in children. It has been used as a diaphoretic, as a vaginal douche in vaginitis, while also enjoying popular usage in dysmenorrhea and menorrhagia. That is the reason for the German name "Mother Herb".

The older uses of chamomile flowers, such as its diaphoretic properties were documented in 1927 when Wiechowski (1) showed its glycosides to be very effective. According to Lang and Schwandt (2) its well known antispasmotic action is produced by either one of the following constituents: the glycoside Apiin, its flavone derivative Apigenin, or the oxycoumarin derivative Hernarian.

More recently chamazulene, the important ingredient in chamomile oil and the most active of the azulenes, has also been shown to be an antiallergic. This action is intimately associated with its antiphlogistic activity and while the mode of action is still unknown, Koch (3) and Jancso (4) have expressed theories on the subject. All deal with the ability of chamazulene to release histamine. Accordingly, chamazulene causes a uniform and long lasting liberation of histamine which in turn activates the reticuloendothelial system. This release is said to be caused by both chemical and mechanical means. The stimulation of the entire cellular resistance then promotes the care and healing of the organism. Stern and Milin (5) in 1956, however, proposed that the azulene prevents histamine liberation from tissues and counteracts the blood pressure drop and edema formation caused by histamine releasing compounds and proteins. It also reduces the severity of inflammatory processes.

Recent work contends that aqueous chamomile extracts are effective in arthritis when compared to sodium salicylate and antipyrine (6). Chamomile decoctions have also stopped tumor growth in mice, but no direct effect on cancerous growth has been proven (7).

Reports of the favorable activity of chamomile and its constituents on the human body and in particular the azulenes on human skin are of importance to the pharmacist as well as the cosmetologist. The internal action of chamomile preparations has been recognized and used for a long time. The more recent usage of azulenes to care for and protect the skin provide the cosmetic industry with substances capable of healing inflammations, wounds and mucosal membranes.

Botanical description and constituents

There are two types of chamomile flowers used commercially. The Hungarian type which is the most widely used, *Matricaria chamomila*, is an annual herb indigenous to Europe and Western Asia and naturalized in Australia and parts of the United States. The mature flower heads are collected from wild plants which may lead to the possibility of confusion with other flower heads of the *Compositae* family. Occasionally the addition of weeds from the countries of orgin is possible, emphasizing the need for control over crop collection and the requirement of proper botanical authentication as well as processing and storage of the drug.

The other type is the Roman Chamomile, *Anthemis nobilis*, a perennial herb indigenous to southern and western Europe and cultivated in Europe and the United States. The flowers are collected from cultivated plants and dried by artificial means.

Both types contain a volatile oil, an average of 0.25% in the Hungarian and 1% in the Roman, anthemic acid and tannins. The Roman species contains a bitter crystalline glycoside, anthemisol; 5.25% of resin; and 1.5% of a bitter crystalline wax. Its volatile oil consists principally of the isobutyl, amyl and hexyl esters of butyric, angelic and tiglic acids, anthemol, an isomer of camphor, and azulene.

The *Matricaria* variety has been examined much more thoroughly. In 1914, Power and Browning, Jr. (8) prepared an alcoholic extract of the flowers. Further treatment yielded an unsaponifiable portion containing a paraffin-hydrocarbon, triacontane and a phytosterol glycoside as well as a phytosterol. Salicylic and caprylic acids, a glycoside apiin yielding apigenin on hydrolysis, some coumarin derivatives as well as levulose and choline were also found. Beguin (9) in 1933 further stated that chamomile belongs to those few plants containing either no or very small amounts of glucose. He also isolated a compound which he described as a β- heteroside (10). More recently Lang and Schwandt (2) have demonstrated the presence of flavonoids in the flowers. According to Schindler (11) and also Rolleri (12) nicotinic acid is present and Guenther and coworkers (13) found vitamin C to the extent of 32.6 mg% in fresh flowers and 48.6 mg% in the fresh herb.

Undoubtedly, however, the most interesting constituent is the volatile oil of chamomile. It occurs in the flowers only. In fact the receptacles provide two to three times more volatile oil than the florets both ligulate and tubular.

This oil possesses a blue tint now known to be due to a group of azulenic sesquiterpenoids. The color of the oil will actually vary from light blue to green-blue to dark blue. It was once thought that this might provide a basis for distinguishing between the German, Yugoslavian and Hungarian varieties of Chamomile but according to Hartwich and Jama (14), as well as Kaiser, Eggensperger and Baermann (15), it is impossible to determine the origin of a sample by the color of oil it will produce. They found, however, that florets alone when used produced a dark oil whereas the oil resulting from the use of receptacles was greenish. The freshly distilled oil on exposure to light and air gradually turns brown. It is important to note that there is little relationship between the oil content and azulene content of the drug.

An important discovery was that azulenes do not exist naturally but rather are formed during the production of the oil by steam distillation from azulenogenic substances sometimes referred to as proazulenes. The chamazulene precursor of chamomile is matricin. Thus extractions of the drug with ether, petroleum ether, chloroform, methanol, ethanol or warm water yield only yellow or light green colored solutions. Proazulene is not volatile with steam but decomposes through distillation into the volatile azulene. This process also occurs in a slightly acid solution, whereas it remains stable in the presence of ammonia. Therefore alkaline extractions would yield no azulenes.

Recently Kaiser and Hosenmaier (16) revised the view that only azulene precursors, and not azulene as such are present in chamomile. They found no azulene present in the fresh drug, but did find it to occur together with proazulenes in the dried material.

Azulenes

The term "Azulene" was first coined in 1863 by the French chemist, Piesse (17), who isolated a blue fraction from chamomile oil and recognized its hydrocarbon nature, thus applying the term "Azulene". The name has since been transferred to the parent hydrocarbon of this series of compounds.

Azulenes have been designated by trivial names depending upon their natural source. Thus a prefix abbreviating the name of the plant yielding a volatile oil containing azulenes is used. Chamazulene is the azulene of chamomile oil and is also found in the oils of milfoil, wormwood, Roman chamomile and other *Artemisia* species. Guaiazulene is obtained from guaiac wood oil, geranium and cubeb oils among others, whereas vetivazulene comes from vetiver oil.

The research of a number of scientists provided the basis for the elucidation of the chemistry of the azulenes. It was Plattner and Pfau (18) in 1936, however, who showed the azulene molecule to be basically a fused five and seven membered ring, having a series of 5 conjugated double bonds. This structure is basic to chamazulene, guaiazulene, vetivazulene, etc. accounting for their blue color as well as their reactivity and many possible derivatives.

Ten years later guaiazulene and vetivazulene were shown to be isomeric with one another. Chemically guaiazulene is 1,4-dimethyl-7-isopropyl-azulene and vetivazulene 4,8-dimethyl-2-isopropyl-azulene. Determining the structure of chamazulene was more difficult and not until 1953 was it shown to be an independent substance containing one less atom and not merely another isomer of guaiazulene. Sorm (19), Meisels (20), and Stahl (21) elucidated the structure as 1,4-dimethyl-7-ethyl-azulene. P. de Mayo (22) recently reviewed the chemistry of the azulenes.

To summarize, chamomile flowers remains an important botanical which is being used in large quantities in the pharmaceutical and cosmetic industries. The major form of use remains as a tea. It is also used in extract form in which the flowers are extracted with alcohol and the product incorporated in many special tonic formulas, shampoos, etc. Recently, an azulene enriched hair creme as well as a guaiazulene enriched dental paste have appeared on the market. It is claimed that cosmetics use prophylactic doses varying between 5 and 20 gm per 100 kg of bulk.

This brief discussion of a botanical once again emphasizes the need for reviewing the "well known" botanicals both pharmacologically and chemically. It is only with the newer techniques of isolation and purification and the pharmacological screening program of the large pharmaceutical manufacturers that the true value of some of these botanicals can be established and new classes of physiologically active compounds can be discovered and ultimately synthesized.

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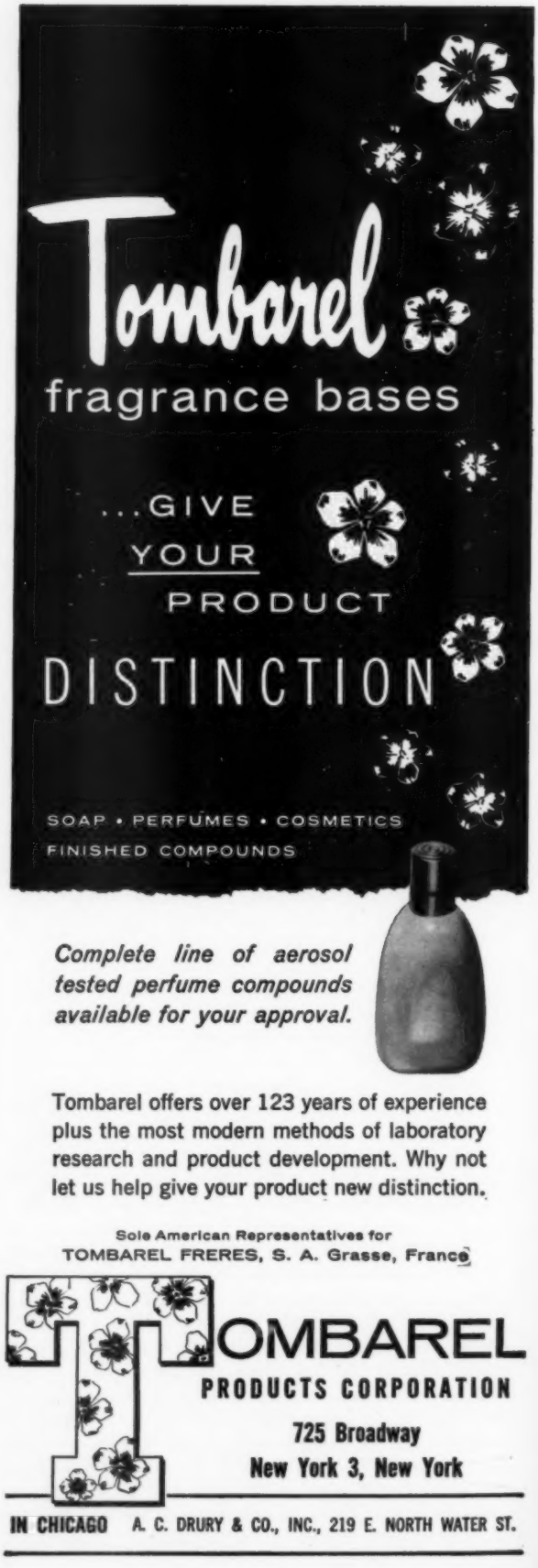
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Skin respiration vital to good health

By Henry Goldschmiedt, Ph.D.
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Many references are made in scientific literature regarding the importance of skin respiration. Senator (1), in 1894, wrote about the incident of a boy whose body was lacquered with gold paint so that he could play the part of an angel. The boy took fatally ill, his skin respiration completely cut off by paint.

There have been fatal effects from application of gold paint or lacquer to the entire skin surface of performers. However, the question was as to whether death was caused by interference with the physiological functions of the skin, or due to absorption of toxic materials from paint or lacquer. There is presently, however, no doubt that impaired skin respiration will result in ill health.

All of the external covering of a human or animal body is skin, and this encasement of human or animal body needs respiration, breathing, inhalation and exhalation, intake of oxygen and giving off carbon dioxide, in order to produce a normal well being of the body. The act or process of breathing of the skin is Skin Respiration.

Landois (1) showed that the surface of human skin amounts to approximately 1½ - m^2 (square meter) and can be determined from the body weight of a person in grams: ($S = C \sqrt[3]{grs.^2}$) "C" figuring as a Constant, S = Surface. This constant "C" is 12.5 for a human, and 11.16 for a dog, for example. This little example holds true for a human or animal body, and for a calculation of the average surface of human skin.

Like any organ or tissue in which vital functions are taking place, the human or animal skin takes in oxygen and gives off carbon dioxide. The largest part of oxygen needed by human or animal skin is mainly absorbed by the blood, and the remaining part directly from the environs of air. The discharge of carbon dioxide goes to a great extent through the blood and a small amount into the surrounding atmosphere.

It has been found that the stratum corneum of the skin is acidic. We think that part of the acidity comes from carbon dioxide perspiration vapors, while the mucous layer below is slightly alkaline.

Although skin respiration, if compared with regular breathing through the lungs, is relatively small, Shaw and Messer (3) insist that normally human or animal skin needs besides the oxygen coming to it from the blood stream, a certain amount from the environs of the air. The penetrability of water or other chemicals in the different cosmetic or dermatological products has been studied, but it has not been studied thoroughly enough in regard to skin respiration. As a matter of fact, hardly any attention has been paid to this very important factor concerning not only the well being of the skin but the human and animal body as such.

Babok (4) writes about experiments with animals. The skin of rats was painted, and the animals died.

Rohrig (5) writes about tests with frogs. Frogs' life depends largely on skin respiration. Frogs dipped into oil died instantly as the oil caused a cut off of intake of oxygen, skin respiration was stopped and the animals suffocated.

There is still pending the question among scientists whether or not death can be caused by a drastic interference with the normal physiological function of the skin. Based on my studies I believe that in the act of absorbing poisonous matters from a coloring substance or varnish or any noxious chemical, destructive to life and health, general health of skin and body must suffer badly, and there is no doubt in my mind that skin respiration as such, and all our

The work herein described was accomplished with the technical assistance of Melitta Goldschmiedt (deceased) and Harold Edelstein.

concern for its perfect function, is vital to health, life and even beauty. Human and animal skin is almost impervious to water and most electrolytes since the skin is an electrical or polarized barrier to the normal passage of ions.

The retention, holding back of exhaling carbon dioxide, must produce a toxic condition in the body as it is supposed to be discharged by the body by way of normal perspiration through the skin. If such unloading of carbon dioxide is made impossible, the condition of health suffers seriously.

Presently, research and experiments are in progress on the importance of skin respiration. Some companies in the cosmetic and pharmaceutical industry have their products carefully investigated to ascertain whether their products stimulate or inhibit skin respiration.

Amersbach, Nutini and Cook (6) have found the measurement of skin respiration a valuable dermatological tool. They discovered that in case of vitamin deficiency the rate of skin respiration decreases and that preservatives and antiseptics also depress skin respiration. Fatty acids do the same, they say.

Adams (7) has demonstrated a decline in the respiration of rat or mouse skin with increasing age.

Brotzge (8) has confirmed the results obtained by Adams, and Walter and Amersbach (9) investigated the respiratory rate of human skin with the result that the oxygen consumption of skin is lower in older than in younger subjects.

Weiss (10) used the manometric method for testing the activity of tissue extracts. The oxygen consumption or the increase of tissue respiration was used for standardization, and mice ascites or rat liver homogenates used as substrate.

Cook, Kreke and Nutini (11) found that yeast contains factors which stimulate the respiration of rat skin and rat liver.

Leibsohn's studies (12) showed that the skin requires 7% of the normal, resting, total body oxygen consumption: 4% for the epidermis, 3% for the dermis.

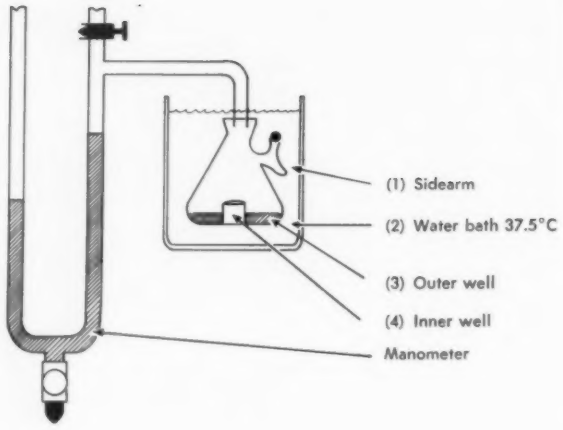
Tests of Skin Respiration

In 1912, Warburg initiated studies of the metabolism of tissue slices, using the manometric technique. The apparatus, which had been invented ten years earlier, measures quantitative changes in gas volume or pressure. The Warburg procedure permits a study of the metabolism of small segments of a particular tissue or organ by determining manometrically the rate of oxygen utilization and carbon dioxide production (skin or tissue respiration).

This technique has been extended to minces of tissues and broken cell or cell-free preparations of tissues or skin, as well as tissue or skin slices. By this procedure it is possible to study in vivo one metabolic transformation, or more than one, of the total metabolic picture, and to examine the enzymic systems influencing these reactions.

At this point I would like to describe our research method. (See picture below.)

We use sliced skin of baby mice as a substrate. It is hairless and has no adipose tissue. The pieces of cell formations (tissue) are used as soon as possible after removal and kept at body temperature in Ringer solution until used in the Warburg apparatus.



The skin slices and 3 ml. of Krebs Ringer solution are homogenized. In the outer well of each vessel we put 2.0 ml. skin slices, homogenized in Krebs Ringer Phosphate Dextrose solution, (0.2% dextrose) adding 1.0 ml. of Krebs Ringer solution. The inner well of the vessels we fill with 0.2 ml. of a 20% Potassium hydroxide solution, using filter paper to enlarge the surface of the inner well of the vessel. In the sidearm we put 0.2 ml. of the material which we wish to test for measurement of skin respiration, and it is necessary to use the same quantities and contents for the outer wells of each vessel, as well as for the inner wells of the respective vessels. Only in the sidearm we use different materials we wish to test but in equal quantities.

The manometers are shaken at a rate of 120 oscillations per minute for a two hour respiration period at 37° C. After an equilibrium period of 15 to 20 minutes, we dip the solution of the sidearm into the solution of the outer well and mix. At intervals of 10 minutes, readings are being taken for 60 minutes.

We work with living skin. Therefore, we can say our method of research procedure is done in vivo. The skin lives about two hours and the span of its life can be prolonged with additives: vitamins, co-enzymes, etc. During the examination, when readings are taken each 10 minutes, we found that these additives stimulate a greater and better skin respiration.

Using baby mouse skin, we work with the same age group and take skin from the same part of the animal, which is impossible when experimenting with human skin. Human skin has to be taken sometimes from the arm, sometimes from the leg or other parts of the body, sometimes from male, sometimes female, and has adipose tissues. As long as our research is a matter of micromethode, the exact results are best obtainable by using baby mouse skin as a standard.

Experiments

Experiment No. 1. We did an experiment by using as a substrate homogenized skin and Potassium Hydroxide to absorb the carbon dioxide. We could study the respiration process and found the life span of the skin was two to three hours.

Experiment No. 2. As far as the difference between human and animal skin is concerned, we found that human skin and animal skin show comparatively the same stimulating or inhibiting effects, and therefore for a standardized test we consider only the baby mouse skin.

Experiment No. 3. This method is also very useful in order to state an exact pharmaceutical or cosmetic dosage. We found that a larger dosage than necessary act as inhibitor instead of as stimulator. We tested a number of chemicals and pharmaceuticals, the results of which are as follows: We use Hydrocortisone: 1%, 2% and 3%.* The maximum stimulating effect on skin respiration is at 2% solution. Three per cent solution is already an inhibitor. Placenta extract** works in about the same way. My tests shows that placenta extract highly stimulates skin respiration, showing very large increases as compared to the substrate. We tested solutions containing 1%, 3% and 5% of placenta extract of this brand. A 3% placenta solution shows the greatest increase in skin respiration; at 5% the increase is slightly lower. We, therefore, believe that the optimum effect is reached with a 3% placenta extract solution. A 1% placenta solution with an added co-enzyme, pantothenic acid, shows almost the same large increase in skin respiration as a 3% solution without co-enzyme.

In my article "Measuring Skin Respiration" (13) I mention that tests with ointments and cream bases show that some cream bases give a remarkable increase in skin respiration since they contain only a small amount of preservatives, which act as inhibitors.

Experiment No. 4. Cream base with an oil containing a high percentage of free fatty acids shows a large decrease in skin respiration, since fatty acids and some oils act as inhibitors.

Besides the two formulae I gave in my above mentioned article, I found in my recent research that a lanolin ester which contains all cholesterols and lanolin oily lipids gives me a good respiration rate. In this type lanolin ester all the waxy lipids are removed. Higher weight straight chain fatty esters, say C^{20} to C^{30}, which are insoluble in oil and solid at room temperature, are fractioned out together with some of the higher melting point esters. These liquid esters with the Cholesterols are active carriers for additives in skin preparations to reactivate and stimulate skin respirations.

Experiment No. 5. Goldschmiedt (14) tested alkaline phosphatase on skin respiration and found that alkaline phosphatase increased the skin respiration. With magnesium chloride or magnesium sulfate you get a larger increase on the oxygen consumption. You also get an increase on the respiration rate with pantothenic acid. With Sodium flouride a decrease on respiration takes place.

Experiment No. 6. We made artificial burns on baby mouse skin and discovered:

(1) The burn area has no respiration at all.
(2) With Krebs Ringer solution, we found a slight increase of the respiration rate.
(3) With some oil on the burned skin, shows no respiration rate at all.

Experiment No. 7. We tested various preservatives and found that Chlorobutanol in a percentage higher than 0.5% acts as a strong inhibitor. The same is true with Butyl alcohol.

Experiment No. 8. The Biometals, enzyme activators, Mn. An, Fe, Co, Ni, Cu, within univalent or bivalent cations of 0.1N% solutions are stimulating the skin respiration. With higher valent cations in 0.01N% solution, they are inhibitors. Also, lead and barium are inhibitors.

Conclusion

Methods of measuring skin respiration have been outlined. In support of the suggestion that skin respiration is a criterion of skin health it has been shown that some pathological conditions and the action of certain toxic agents are characterized by a lowering of skin respiration. Certain cosmetics also depress skin respiration but this depression can be overcome wholly or in part by using a good carrier cream or ointment base and additives which stimulate the skin respiration.

We believe that the manometric method can become a valuable tool for research and analytical chemistry and should be used in compounding new formulae. The method is simple and tests can be made rather rapidly. It is possible to standardize every organic preparation. With this method it should also be possible to arrive at the optimum effect for skin preparations by measuring their influence on skin respiration and establishing the correct dosages. For the pharmaceutical as well as for the cosmetic chemist, it is of course highly important to know which substances, such as creams, ointment bases, perfume oils, detergents, soaps, are able to depress or to stimulate skin respiration. A stimulating effect on the skin is, after all, the purpose of most cosmetics and skin remedies.

* *We tested a special brand.*

** *In regard to placenta extract, I made my own placenta extract from human sources.*
After extraction in saline solution I lyophilised them and the resulting powder I used for my tests. The 1-3-5% means by weight. I standardized my placenta extract by stimulating the effects on the skin and not on enzyme activities. I believe you get better results and dosages with this method.
The results vary from batch to batch and depend also on the method of manufacture.

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Vinyl copolymer in the cosmetic cosmos

By Paul Weitz
National Starch and Chemical Corp.

Ten years ago the cosmetic industry had not yet been foreseen by our company as a potential market for its resin products. At that time we were oriented along two major lines—packaging adhesives and starches for paper, food and textile purposes. Our vinyl acetate polymer research program was moving into high gear, but our marketing plans were focused mainly on industries where its binding and sizing properties could be exploited.

More recently, however, a polyvinyl acetate lacquer was introduced for aerosol Christmas snow, and as our technical market development specialists gained greater familiarity with the burgeoning aerosol industry, they set their sights on hair lacquers as a prime target. After screening many polymers, a copolymer which was previously a laboratory curiosity was found to fill the bill very nicely. Today this product is in limited use in the aerosol hair spray field and a number of companies are exploring nonaerosol cosmetic uses.

This paper will serve to acquaint the reader with polyvinyl acetate generally, and one unique copolymer specifically. It will describe its derivation and polymerization, as well as the preparation of vinyl acetate copolymers. A complete review of the properties of polyvinyl acetate and its copolymer will follow, with emphasis on properties useful in cosmetics.

Data will then be given covering the properties of our copolymer (1), as prepared for hair sprays. Information will be presented on its aerosol properties, as well as tests for safety run by an independent laboratory.

The patent position on resins for hair sprays will be described, and details given on field experience in hair sprays.

Reprinted from the Journal of the Society of Cosmetic Chemists, XI, 5, 1960

Polyvinyl acetate

While polyvinyl acetates are new to the cosmetics field, they have a successful history in many applications where important properties such as product stability, lack of skin irritation, odor and color are prime requirements.

The single largest and oldest use of this versatile synthetic resin is as a packaging adhesive. A multitude of different packaging materials are effectively bonded and many of these uses require a product which is odorless, colorless, and safe for food packages. Typical examples are milk cartons, paper cups and containers, paper straws, food cartons and bags, etc. In recent years polyvinyl acetate has become popular for remoistening gums on envelopes.

A second important category is pigment binding, exemplified in the popular emulsion based paints and paper coatings. As a raw material for paints, poly-

vinyl acetate is notable for its strong film which does not discolor when exposed to light and heat. In the latter case the resin binds clay and other low-cost pigments and adheres them to paper and board to provide a smooth surface suitable for printing and coating.

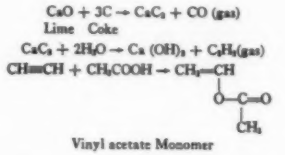

Figure 1.—Chemical derivation of polyvinyl acetate.

Another major use is in the field of nonwoven fiber binders, where textile fibers are adhered to each other rather than woven. Some of the many products made are table cloths and napkins, disposable diapers and sanitary napkins.

The last major category to be mentioned, although there are many other important uses, is textile finishing. Polyvinyl acetate is widely used on many classes of textile goods. It is common to find clothing such as shirts, blouses, underwear, pajamas and accessories such as handkerchiefs given a lustrous and moderately soft finish through the use of a resin sizing.

A noteworthy though minor and old-time use of polyvinyl acetate is as a base in chewing gum.

Chemistry of PVAc

Polyvinyl acetate is a synthetic resin derived from abundantly available natural raw materials. The chain of events starts with lime and coke which are reacted in an electric furnace to yield calcium carbide. As shown in Fig. 1, when this material is mixed with water, acetylene is removed as a gas. Its reaction with acetic acid produces vinyl acetate monomer.

You will note in Fig. 2 that the monomer units are joined when they are excited by an activator such as benzoyl peroxide. Under heat the peroxide splits into two benzoyl free radicals which are in a highly active state due to the presence of a free electron. The double bond of the vinyl group opens and forms a covalent bond with the benzoyl radical. At the same time the energy is transferred to the free end of the monomer which in turn reacts with a second monomer unit. This step repeats itself many times until the monomer is used up and the active ends of the chains join with each other.

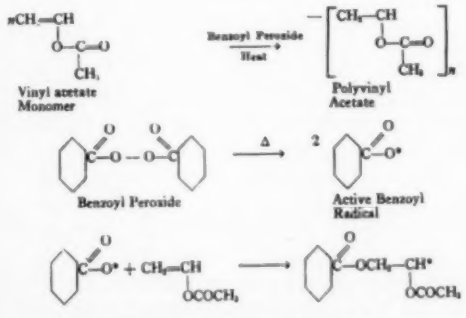

Figure 2.—Polymerization of polyvinyl acetate.

Polymerization reactions are usually carried out in solution, emulsion or suspension form to insure a low viscosity for uniform agitation and removal of the heat of polymerization. When emulsion or suspension polymerization is used, suitable emulsifiers and/or suspending agents must be used. The solvent used for solution polymerization must be chosen carefully, since it plays an important role in reaching the desired molecular weight level. The polyvinyl acetate copolymer being highlighted is prepared by such polymerization methods and dried to yield a translucent bead.

Although we are all familiar with the terms polymer and copolymer, it is important to call attention here to some of the differences between them. A conventional polymer, or homopolymer as it is sometimes called, can only be varied to a certain extent, for example its molecular weight and degree of chain branching. its film properties will have essentially the same physical and chemical characteristics. Thus, by introducing special chemical constituents into the polymer backbone, we can modify the intrinsic properties and tailor make a product to fit a specific end use.

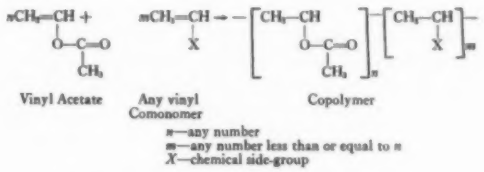

Figure 3.—Copolymerization of vinyl acetate.

Some of the chemistry of polyvinyl acetate copolymerization is shown in Fig. 3. Any material introduced into the polymerization as a comonomer must have a similar vinyl structure which is capable of joining in the reaction.

One of the more common modifications of the polymer is softening or internally plasticizing. Three typical families of comonomers are:

Acrylic Esters
Maleic and Fumaric Esters
Higher Vinyl Esters

Their chemical formulae are shown in Fig. 4.

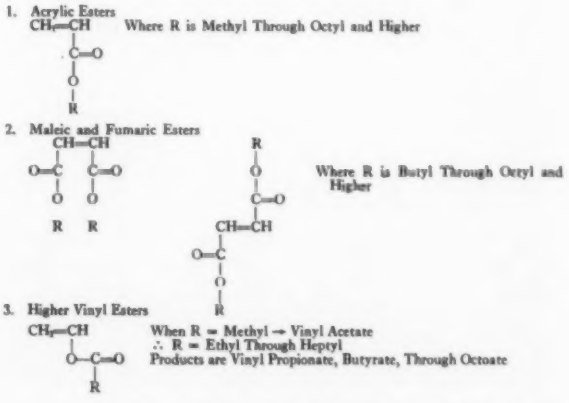
1. Acrylic Esters
Where R is Methyl Through Octyl and Higher
2. Maleic and Fumaric Esters
Where R is Butyl Through Octyl and Higher
3. Higher Vinyl Esters
When R = Methyl → Vinyl Acetate
∴ R = Ethyl Through Heptyl
Products are Vinyl Propionate, Butyrate, Through Octoate

Figure 4.—Typical comonomers; softening or internal plasticizing.

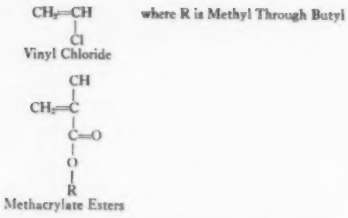

Figure 5.—Typical Comonomers; Hardening.

The most important factor determining the plasticizing efficiency is the length of the sidegroup R attached to the comonomer. The longer the R group, the greater the chain separation and therefore the plasticizing effect. Because the plasticizer is an integral part of the backbone we have permanent and nonmigratory plasticizing. Many internally plasticized polyvinyl acetates show specific adhesion compared with conventionally plasticized homopolymers.

It is also possible to harden the polymer through the use of selective comonmers which bring the polymer chains closer together. Two typical comonomers, vinyl chloride and the lower alkyl methacrylates, are shown in Fig. 5. The resultant copolymer will reflect the personality of the particular comonomer used. For example, if we take a 50-50 vinyl chloride–acetate copolymer, it will adhere to vinyl chloride plastic (which acetate ordinarily does not) and to many polar surfaces such as metal, glass, wood, cloth, etc. (which chloride ordinarily does not). The chloride would also bolster the heat and chemical resistance of the acetate.

Of equally great importance in polymer pyrotechnics is the introduction of polar chemical groups such as amide, carboxyl and cyano into the backbone. These modifications improve adhesion to more polar surfaces as well as provide a site for further chemical

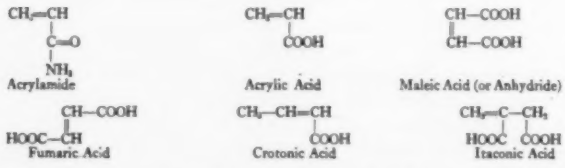

Figure 6.—Addition of Polar Chemical Groups.

Figure 7.—Beads of National's Resyn 28-1310, polyvinyl acetate copolymer.

reaction. The carboxyl group is particularly sensitive to alkaline materials and thus provides soap solubility.

Up to now the material (Resyn 28-1310) has been referred to simply as a polyvinyl acetate copolymer. More accurately, it is a polyvinyl acetate copolymer containing carboxyl groups through its copolymerization with one of the reactive acids shown in Fig. 6. The copolymer contains less than 20 per cent by weight of the comonomer.

Figure 7 is a picture of the beads as they are supplied.

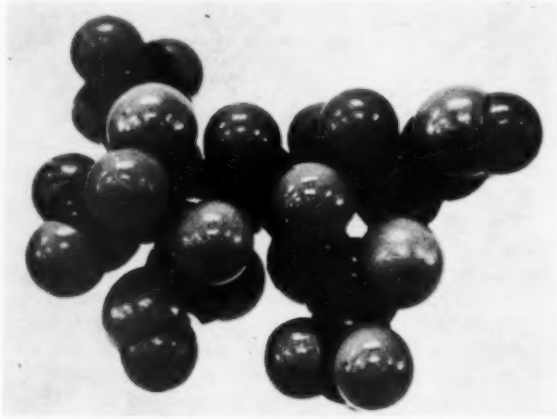

Figure 8.—A model showing the molecular configuration of National's Resyn 28-1310.

Figure 8 shows the molecular configuration of a typical carboxyl copolymer.

Due to the presence of the carboxyl groups an unusual balance of properties is present. The resin is soluble both in solvents and in water, a property possessed by a limited number of polymers. The solvents which may be used for the preparation of solutions are the alcohols, alcohol-ethers, ketones, esters, halogenated aliphatic hydrocarbons–in short, practically all of the common solvents, except the aliphatics such as hexane and heptane and aromatics such as toluene. Water solutions may be obtained by partial or complete neutralization of the carboxyl groups with ammonia or stronger alkalis.

One group of compounds which performs an especially useful function is the aminohydroxys. The reaction product with the vinyl copolymer is a water soluble salt. One aminohydroxy in particular, AMPD, which is 2-amino-2-methyl-1, 3-propanediol, offers permanent neutralization without upsetting solvent solubility properties. Thus, to prepare an alcohol solution of the vinyl copolymer which will dry to films soluble in tap water, simply add AMPD to the finished solution or to the alcohol before preparation of the solution, whichever is more convenient.

Figure 9 shows the chemical structure of AMPD as well as a suggested formula depicting the salt formation.

Table 1 shows the effect on the copolymer's film properties of varying the neutralization with AMPD. Note that the aminohydroxy compound acts as a plasticizer for the resin since the Sward Rocker Hardness values decrease.

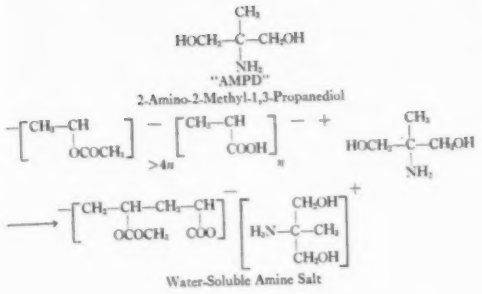

Figure 9.

TABLE 1

Per Cent Neutralization	Sward Rocker Hardness Value	Water Solubility of Film Air Dried 1 Week at 72°F.
0	44	Poor
50	42	Poor
70	40	Fair
80	32	Good
90	30	Excellent
100	24	Excellent
110	18	Excellent
125	16	Excellent

Sward Rocker is a method for measuring surface hardness of a film in relation to plate glass which is given a value of 100. It indirectly measures flexibility (i.e. materials which are soft are also generally flexible).

Figure 10 depicts the solubility characteristics of cast films. Dye has been added to the coatings to make the properties more easily discernible. The first sample shows the relative insolubility of the unneutralized resin in tap water. The second sample is 90 per cent neutralized resin and it dissolves readily in tap water. The third sample shows the solubility of the unneutralized resin in a typical shampoo solution.*

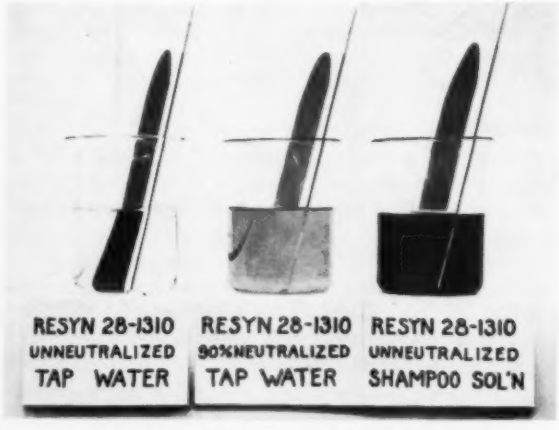

Figure 10.—Solubility characteristics of cast films.

This data is useful when considering the problems of formulating to meet consumer requirements. Thus, while the film dissolves readily in shampoo, it is possible to build in an extra safety factor by neutralizing partially or completely to provide a measure of water solubility.

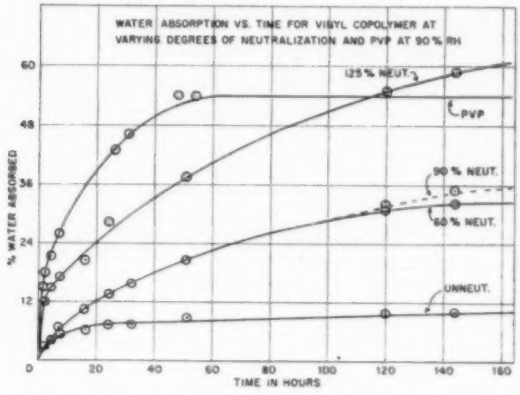

Figure 11.—Moisture pick up rate at 50 per cent relative humidity for the 90 per cent neutralized resin vs. PVP.

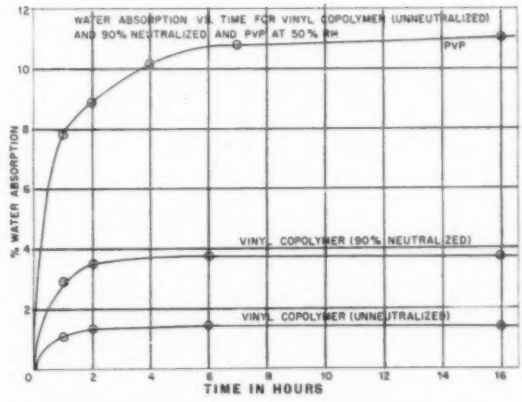
WATER ABSORPTION VS. TIME FOR VINYL COPOLYMER (UNNEUTRALIZED) AND 90% NEUTRALIZED AND PVP AT 50% RH
PVP
VINYL COPOLYMER (90% NEUTRALIZED)
VINYL COPOLYMER (UNNEUTRALIZED)
% WATER ABSORPTION
TIME IN HOURS

Figure 12.—Moisture picks up at 90 per cent relative humidity of the vinyl copolymer at varying degrees of neutralization.

Figure 11 is a graph of moisture pick-up rate at 50 per cent relative humidity for the 90 per cent neutralized and unneutralized resin *vs.* PVP, another one of the few water and solvent soluble resins. Note that the rate of moisture pick up is approximately the same for the three materials. The lower levels of saturation of the vinyl copolymer are an indication of lower water sensitivity. The neutralization with AMPD, in addition to making the film more water soluble as shown in Fig. 10, also increases the moisture sensitivity.

Figure 12 is a similar graph showing the moisture pickups at 90 per cent relative humidity of the vinyl copolymer at varying degrees of neutralization. Note that increasing the degree of neutralization increases moisture sensitivity and that excess neutralization actually raises the moisture pick up above that of the PVP. The rate of moisture pick up for PVP is greater than the vinyl copolymer at 90 per cent R.H. Note too the higher levels of moisture pick up. At 50 per cent R.H. the 90 per cent neutralized resin picked up approximately 4 per cent moisture, while at 90 per cent R.H. the pickup was approximately 36 per cent.

*Author's Note: *The difference in color between second and third solutions is caused by color of shampoo combining with that of dye.*

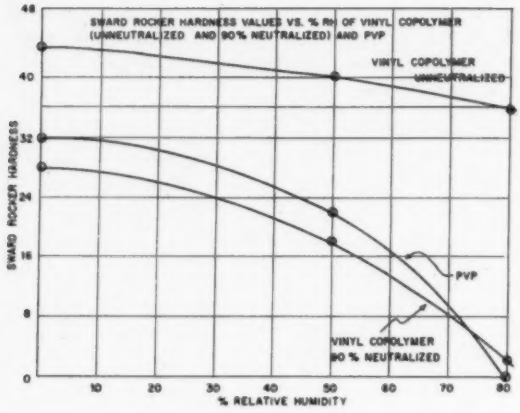

Figure 13.—Comparative Sward rocker hardness for PVP and resyn 28-1310, on neutralized and 90 per cent neutralized, at varying humidities.

Figure 13 is a graph showing comparative Sward Rocker Hardnesses for PVP, the unneutralized and 90 per cent neutralized resin at varying humidities. Note the relatively high value retained by the unneutralized resin.

Properties of PVAc

The previous discussion on the chemistry of PVAc polymers and the photos and graphs have touched on some of its properties. It will be useful at this point to summarize the properties of polyvinyl acetate in general and the carboxyl containing copolymer in particular.

Properties of Polyvinyl Acetate Resin

1. Thermoplastic.
2. Good adhesion to many surfaces.
3. Water resistant.
4. High moisture vapor permeability.
5. Colorless.
6. Odorless.
7. Grease resistant.
8. Light and heat stable.
9. Good long term aging in liquid and dry states.
10. Resists bacteriological decomposition.
11. Soluble in all common solvents except aliphatic hydrocarbons.
12. Compatibility with a wide range of modifying ingredients.
13. Good pigment binder.

Additional Properties of the Carboxyl Copolymer

1. When unmodified soluble in alkaline media.
2. When neutralized, soluble in tap water.
3. Improved adhesion to polar surfaces.
4. Capable of further reaction at the carboxyl group (neutralization is one type of reaction).

This chart shows all the properties common to the acetate homopolymers. In the lower section are those properties possessed by carboxyl containing copolymers—in addition to those above.

Hair spray properties

The properties just described help to determine the potential usefulness of the vinyl acetate copolymer for specific cosmetic uses. For hair spray in particular, commercially prepared aerosols have shown:

Good affinity for hair
Good luster
Good curl control
Controlled water sensitivity
  A. Nonhygroscopic
  B. Nontacky
Alkali dispersibility

Aerosol packaging properties

Aerosol hair sprays based on the vinyl acetate copolymer are being packaged using conventional cold filling methods and the most widely used propellants, trichloromonofluoromethane and dichlorodifluoromethane. While solutions are cloudy at —20°F., they do not precipitate, thus permitting filling at this ideal cold filling temperature.

Conventional tin lined cans can be used without corrosion problems.

Tests for health safety

Tests have been run on the copolymer by an outside laboratory specializing in animal studies for health safety. The following tests have been made with no harmful effects noted:

1. Skin irritation.
2. Eye irritation.
3. Oral lethal dosage.

These tests were run according to methods outlined by Draize in the October, 1955 issue of *Food, Drug, Cosmetic Law Journal*. The results of a three-month aerosol inhalation test were not available at this writing. The test method was suggested by Draize at the May, 1958 meeting of the Scientific Section of the Toilet Goods Association.

Patent picture

The product, its neutralization with AMPD, and its application is unusual enough to warrant patenting. An application has been made, and we are highly confident that the patent will issue. The product described is in no way related to other patented hair spray resins.

Conclusions

There are probably a number of cosmetic and pharmaceutical applications where a resin with water and solvent solubility properties as well as alkali dispersibility can perform a useful functon. Examples would be where there is need for a resinous binder for colorants and other inert and/or nonadhering materials.

At the present time, this product is finding use in just such an application; that is in hair sprays. At the time of this writing, a number of companies have already been sufficiently impressed by the properties of this resin to advance beyond the testing stage. Consumer acceptance tests and the response of aerosol fillers testing it lead us to believe that this resin will become an important factor in the aerosol hair spray field.

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(1) Resyn 28—1310, National Starch and Chemical Corp; Plainfield, N. J.

Pictures of tour members in London

With the SCC tour - by Maison G. deNavarre

This report will be continued in our next issue

The arranging of a major International Congress in one country to coincide with scientific meetings in three additional countries is a feat in itself. Much credit must go to those in the Society of Cosmetic Chemists who made the arrangements.

No less a difficult job is that of the tour director, who this year was Glyco's Sam Cohen, working closely with President Jerry Amsterdam, Treasurer Lester Conrad and Secretary Bob Kramer.

There were 17 of us starting out of New York about one hour late, by TWA jet flight #802 on August 19th, arriving at Paris' Orley Airport at about 10:00 a.m., Saturday, August 20th. Awaiting us were the Amsterdams (who had been in Holland), Steve Goode (R.I.T.A. Chemicals) and Roure Bertrand's Dr. Jean Sfiras with his wife and son, Philippe. Here we met the American Express tour guide, Bill Davis, who stayed with us until Lisbon. Here, too, we learned that we were not staying at the Lutetia but at the Grand Hotel Terminus St. Lazare near the train station of the same name. It's really quite a good hotel. Needless to say, we all went directly to sleep. The five hour difference in time and being up all night, is a bit rough on young and old alike.

"Paris is a city much like heaven . . . ."

That night the Lester Conrad's son "Rich", my daughter Marietta, niece Joan, wife Jeanette and I dined with Dr. and Mrs. Sfiras and son Philippe in a delightful place in the Bois de Bolougne area. After the floor show, at about midnight, the four "youngsters" took off for the Latin Quarter in Philippe's Fiat. We parents had a Salignac and went home. (The "kids" got in after the first mass at Notre Dame.)

Sunday morning Dr. Sophie Plechner (Carter Products), joined the deNavarres at mass at the Church of the Blessed Trinity nearby.

Sunday afternoon, the group toured the city. Place de la Concorde, Champs Elysees, Louvre, Notre Dame, at which point, I left the group to catch up with Steve Goode to make the 6:00 p.m. Rapide for the South of France—to Lyon, a city built at the confluence of the Rhone and Soane rivers, dating back to about 1550 A.D. The Rapide is an amazing train. It is smooth doing 400 kilometers in 4 hours. At Lyon, Marcel Gattefosse was awaiting us. A light snack, a glass of Beaujolais and then to bed.

On Monday after breakfast, Steve Goode and I were met again, this time by Dr. Jean Cotte in his air suspension Citroen. The ride, a bit more wild than usual, was preparing us for a hair raising 10 minutes later that night.

We went to the offices and plant of Gattefosse which like so many places in France in August, was all but shut down. There I met handsome Bernard Giullot followed by Dr. E. Mahler and Mme F. Fevrier; we talked about library systems, measurements of consistency of ointments, lipstick, etc. swinging over to embryonic fluid at which point it was time for lunch.

In the suburbs of Lyon is a very pleasant place called "la Sauvage" in the village of Tassin-la-Demi-Lune. Dr. Pierre Dubreuil, Directeur General of the Institut Merieux and Dr. Robert Plan, Chief Chemist, joined us at this lunch. Both spoke English well. We ate outside since the day was right for it. The food was excellent. Our beverage was a nearby vinted Beaujolais, *le vin de la maison.*

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- rinses
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Following lunch we were off to visit the Institut. I wanted to see the processing of human placenta from the time they arrived frozen until the lyophilised extract came down the line.

The Institut Merieux produces a wide range of biological products for human and animal use, Salk polio vaccine among them. This was an educational and interesting tour.

At 6:00 p.m., again the Rapide Mistral for Paris. (Steve and I had a date at the Lido at 11:00 p.m. with wife Jeanette, Marietta and Joan.) Dr. Jean Cotte, Dr. Robert Plan and Marcel Gattefosse were aboard, too. At Paris, we ran ahead of the crowd to get a taxi and finally shared one with a French piano player who spoke English. His stop was around the corner from the Lido. He had five minutes to get to work. They tell me there is no speed limit in Paris. The way this driver got us there, certainly supports that statement, true or false. Outside of getting the "business" from the Cabbie, we made the first show at the Lido. Our ladies were already there finishing dinner. We ordered a Moet and Chandon 1953 champagne to tide us through the show. Very palatable! Excellent show, too. A nightcap at a sidewalk cafe and home to bed.

The tour group all went to the Crazy Horse on Avenue George V to celebrate the Owells' wedding anniversary. It was quite a show—labelled the most "breath-taking" in Paris. Maybe this is a good thing after so many years of married life.

Tuesday morning we did a bit of quick shopping, checked out of our rooms by noon, lunching at a brasserie in the Louvre section. Bought a few water colors and on to the Claridge Hotel on the Champs Elysees, a short distance from the Arc de Triomphe. A farewell champagne party to our group, prior to departure for London was held jointly by R.I.T.A. Chemical, Institut Merieux, and Gattefosse. All were presented a beautiful book describing the Lyon Region with a suitable frontispiece dedicated to our French visit.

Lots of pictures were taken, with beaucoup champagne and hors d'oeuvres. They served a house champagne 1955—'twas very good, indeed. Here we met a number of other people not with our tour, among whom were Martin Sliedrecht and Dr. P. Mulder (Van Schuppen and Zoon) of Holland and Dr. Pierre Velon (Lancome).

Now on bubbles to Le Bourget airport and the BEA flight for London. A smooth trip during wet and overcast weather brought us into London's new airport at dinner time. Awaiting us at London airport were Freddy Herzka and Dr. H. W. Hibbott. We got through customs and immigration easily to go to dinner at the rather new Airport Hotel nearby; then to the Tavistock Hotel in London. Young Terry Pickthall was there to meet us, but maybe he was there to greet the *young* ladies . . . too.

The Tavistock is comfortable. So after a good night's sleep, most of the group went touring, it being a "free day" for all. Bob Marriott phoned during the morning to arrange for the evening reception. Then I had my session with Fred Herzka on behalf of the S. C. C. Journal. We lunched at a pleasant hide-away in the

suburbs of London . . . the name of which failed me. Fred took me to his new offices (Pressurized Packaging Consultants, Ltd.) He is well set up indeed.

His assistant, P. W. Phillips, got me back to London in time to see Reggie Warner (John Gosnell and Son) with whom I had gone to the Glyndebourne opera earlier in the year. Tea and cakes made conversation more exhilerating.

That night Bob and Margot Marriott drove us from the Tavistock to the British Society of Cosmetic Chemists reception. Here I became re-acquainted with many people that I hadn't seen for a year. Among them were Bush's Baron Langley, Rubinstein's Dr. L. Salfeld and Jack Mausner, Pond's "Middy" Middleton, Givaudan's R. E. Eckton, W. R. Littlejohn (editor, PERFUMERY AND ESSENTIAL OIL RECORD), the Hibbotts (Goya), the Fred Rileys (Marchon), the Middletons with whom we talked about travel in the U.S.A., the Botfields (Bush), the Jack Wilkinsons (Lever, who "chaperoned" my young ladies), the Fred Herzkas, Hank van Ameringen who is now working in England, Dr. Pitt (Potter and Moore), Harry Polkinhorne (Yardley), Miss Young (then of Arden), Lautier Fils' Spencer, Chiris' Smith, Pond's Pepper, Douglas Anstead, and H. Wentworth Avis (Coty) not to forget efficient and personable Erica Millman.

After the reception, Hank van Ameringen organized a little party in the Elizabethan room at the Gore Hotel. Between mead, boar's head, candlelight, wooden plates, peacock, claret and an after dinner clay pipe (wenches may be pinched; it is said the custom goes back to good Queen Bess). It is an experience.

Met Karl Boheman (Polak and Schwartz) and his lovely wife. Our conversation couldn't get off the subject of depilatories except to talk about Mrs. B's several years in Canada.

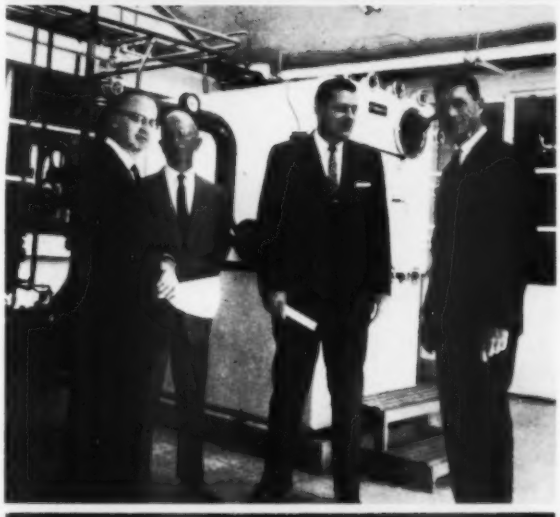
Thursday was the day of the Summer Conference at the Royal College of Surgeons. A program of scientific papers and discussions was well directed by Honorary Organizer, Fred Herzka.

The morning papers given were the following: Surface Chemical Techniques in the Design of Cosmetic Preparations, A. M. Posner; The Techniques of Foam Measurement, by G. E. Neu; The Resistance of Acetylated Lanoline Derivatives to Hydrolysis by L. I. Conrad, K. Motiuk and H. F. Maso; Methods of Determination of Monoester Content of Propylene Glycol Monostearate Non-self Emulsifying, by C. H. Johns and W. P. Pepper.

A group of us lunched at Simpson's on the Strand, the downstairs dining room. Dr. Bob Marriott treated with a beautiful claret (I never got my hands on it to see what it was.)

Back at the scientific conference, ran into Fred Wells, ebullient and peppery editor of our British contemporary, SOAP, PERFUMERY AND COSMETICS. We had a short chat and no more. Inside the conference Dr. Schneider was well into his address. He is a very dynamic and forceful speaker.

The afternoon papers were the following: The Musk Odour, by J. Pickthall and D. Butterfield, Care



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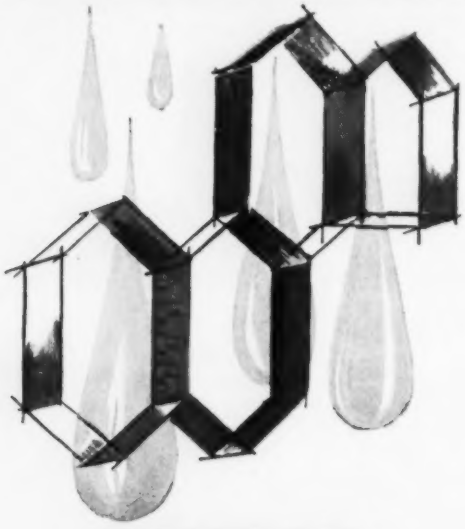

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of the Skin, With Particular Reference to Climate and Season, by W. Schneider, Laboratory Evaluation of New Packaging Materials by S. J. Palling and E. J. Macree, Preservation of Emulsions-p-Hydroxybenzoic Esters Partition Coefficient, by H. W. Hibbott and J. Monk.

I was personally most interested in the paper by Hibbott and Monk on the partition coefficient of the p-hydroxybenzoates between water and certain well-known cosmetic materials. Certainly here was an important consideration for all practical cosmetic chemists—what happens to preservatives dissolved in water, when fatty ingredients are added. Both authors are to be congratulated for adding to our knowledge of preservation.

The banquet that night took place at the Connaught Rooms. It was a charming setting for an interesting evening. Our menu consisted of the following:

Jambon de Parme et Melon
Supreme de Sole aux Fruits de Mer
Ailes de Poulete Bergere
Haricots vert Frais
Pommes Croquettes
Peches Fraiche a la Creme
Biscuit Cuillieres
Cafe

The sole was done in an interesting sauce containing scampi and other sea foods. The peach dessert was flavorful. So was the wine, a Johannisberg, as I remember, with a Grand Marnier finish.

The next day, there was a mad rush to pack-up, pay-up and off for the airport and Geneva. The view of the mountains was awe inspiring. It was a clear warm day in Geneva, the first thus far, where Kurt Pfeiffer (Tokalon) and Dr. Andre Barbier (Givaudan) met us. Our group was split up between three hotels. We were at the Richemond, some at the des Famille and I don't recall the third one. The Marriotts and Hibbotts had joined the group at London airport, although the latter were on holiday until Munich.

We arrived at our hotels late and hence were unable to take advantage of Andre' Firmenich's invitation to visit their new research laboratories as we had a 5:00 p.m. reception at the Palais Eynard given by the Mayor. After the usual exchange of welcome by M. Jean Dutoit, Conseiller d'Etat and acceptance by S. C. C. President Amsterdam, we enjoyed beaucoup quantities of apertifs. I particularly like the tantalizing Valasian Dole, Gloir du Rhone. I had a long chat with the Mapor who spoke fluent English and had recently spent some time in the States. A number of the members of the Swiss Society of Cosmetic Chemists joined us at the reception. Among them were Dr. G. Malet and M. Fred-Henri Firmenich, son of Roger, Dr. Robert Brun, the Mosers, Dr. Nadja Avalle, Dr. W. Guex, Dr. P. Desbaumes, Dr. G. Erlemann and Mr. F. Riondel.

We had dinner at the beautifully located restaurant of the Parc des Eaux-Vines. I don't remember what we ate, but we had another lovely Johannisberg followed by a Dole called the Soleil du Valais.

Saturday was the men's day of work. A group of six papers were given at the Aula of the Institut de Physique of the University of Geneva.

Effect of various metallic ions on the Growth of Penicillium glaucum, Aspergillus niger, and Achorion quinckeamum by R. Brun and A. Maggiora.

Research by Chromatography on Paper of Some Active Substances used in Cosmetics (Allantoin, urea, dihydroxyacetone) by J. Deshusses and P. Desbaumes.

Analysis of Vitamins in Cosmetics by H. Klaui.

New Researches in the Deodorant Field by Professor Dr. Oelkers.

Utilization of Glycyrrhizinic Acid in Dermatology by Dr. Vovan.

The papers by Brun and Desbaumes were of the most interest to me.

After a quick late lunch we boarded a bus at the Gare de Cornavin for a surprise trip to XII century castle and dinner. The castle turned out to be the Chateau d'Oron, high up on a mountainside, originally built in 1252. Few changes have been made since it was built. Only in the kitchen was an electric light in use, otherwise it was illuminated and warmed as it was 700 years ago. As we moved from room to room we stopped in the well kept library where during a seeming spontaneous ceremony, President of the Swiss Society, Kurt Pfeiffer, presented me with the parchment that officially made me an honorary member of the Swiss Society. This I accepted with the following remarks, "I am deeply impressed by the regard of the Societe' Suisse des Chimistes Cosmeticiens and thank you all for this honor. It is with pleasant memories that I recall our first meeting together in 1956 which led to the formation of this society. There were only four of you then . . . . I accept this honor with grateful acknowledgement of all the help given me in my work by my coworkers and many others . . . In the future each time I think of this afternoon, I shall be a little breathless." Jeanette was presented with a beautiful bouquet of roses. It was a solemn few minutes! I shall long remember it. The castle's history was explained in a most interesting manner by M. A. Amiguet.

We walked through the various rooms, saw the ancient heating equipment, ending up in the dining hall, where I can still see the Roti d'Agneau arranged on a series of spits at an immense fireplace, over a wood fire. More Valaisian wines, white and red. Then the local choristers entertained us with songs and dancing popular in the region. After the ceremony of the cheese wheel, cheese and liquors completed our unusual banquet. There was folk dancing for those prepared to dance on cobblestones.

It was after this banquet that on returning to Geneva and our hotels, a group including George Kolar went to a bistro called the Moulin Rouge. My family and I went to our hotel beds. (The next day the "Aztec" disease, "travelers' complaint" or whatever *you* call it—hit).

Sunday to mass at Notre Dame de la Gare near the main railroad station. This church was built about a hundred years ago. At lunch ran into the Hibbotts who were still on holiday.

M. G. deNavarre receiving an honorary membership scroll from the Swiss S.C.C. president K. Pfeiffer

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The entire gang was going to Basle then to Zurich and Innsbruck by train. Here I parted company with them as I was going to Frankfurt and Darmstadt for a couple of days.

> The Swiss Chemical Industry in Basle (Ciba, S.A., J. R. Geigy, S.A., Sandoz, S.A., and F. Hoffman-La-Roche and Co., Ltd.) set up a whirlwind program consisting of a boat trip on the Rhine, (it is here the Rhine turns into Germany and the borders of France, Germany and Switzerland touch), cocktails at Geigy, luncheon at the Solitude Restaurant, a visit to the vitamin plant of Hoffman-LaRoche and dinner at the Schutzenhaus. Geigy's E. C. Caspar and Dr. H. R. Straub were hosts for the Basle chemical industry. Unusual entertainment with yodeling by a famous singer was followed by dancing.

Dr. and Mrs. H. Wilmsmann met me at Frankfurt to drive me to Darmstadt and the Hotel Traube. After signing in we drove to their home for supper and refreshments. They have a very cheerful home. Unfortunately their young daughter was already asleep, so I didn't meet her.

The next day I renewed acquaintances with Drs. H. Freytag and A. Russ and had a chance to say hello to Mr. Karl Megerle.

Hermann Wilmsmann took me to lunch at the Park Restaurant in the hunting lodge Kranichstein near Darmstadt in the middle of the deer district. This place was built in 1572 by George I of Hessen. It is now a guest house and sporting museum.

A bottle of Wickuler's Tafel Pils preceded a saddle of venison. I have yet to eat venison that is better prepared than in Germany.

For dinner that night—in the rain—we went to a place called the Neuhoff. Mind you, a rainy Monday night and the place was jammed. It is an immense restaurant composed of a series of small semi-open adjoining rooms.

Tuesday morning I was seeing a couple of acquaintances met for the first time in Hamburg earlier this year. They were Dr. Fiedler and Mr. Reichelt from the Olivin company who dropped into town from Wiesbaden. After coffee with these gentlemen, I tried to contact Dr. Heimann-Trosien of Merck to discuss aluminum chlorohydroxide and some of their azine based sunscreens, but he was already on his way to Munich and the I.F.S.C.C. meeting.

I had the good fortune to ride with the Wilmsmanns in their Opel via the Autobahn to Munich. It is lovely country—mountains, verdant valleys, rivers and quaint villages. We drove by Mannheim, Heidelberg, Augsburg, to recall a few of the cities. A land of dreaming and yearning, through the romantic neckar into the land of baroque and rococo, of beer, eisbein and saurkraut, and sausages in the hundreds, good coffee and rich pastries, a land of zithers and yodellers and Dirndle costumes and lederhosen. Soon the cathedral towers and the clock spire of the old City Hall told us we had arrived in Munich.

We were in time for dinner. Leaving my bag at the Bayerischer Hof (the Congress headquarters) we went to a place that Hermann Wilmsmann remembered from former times that specialized in pig hock, sauerkraut and a liter of good Munich beer.

Abstracts of selected papers

presented before the

scientific section

of the

American Pharmaceutical Association

Washington D.C., August 14-20, 1960

The Measurement Of Hydrophile-Lipophile Balance Of Surface Active Agents.

A. H. C. Chun and A. N. Martin, School of Pharmacy, Purdue University, Lafayette, Indiana.

An interfacial tension method was developed for the evaluation of Hydrophile-Lipophile Balance (HLB) values of water soluble surface active agents. One tenth per cent aqueous solutions of surfactant were overlayered with toluene and the interfacial tension measurements were made with a du Nouy tensiometer. A linear relationship resulted when the interfacial tension values were plotted against HLB values. This method does not apply to mixtures of surfactants.

Solubilization Of Benzoic Acid Derivatives By Polyoxyethylene Stearates.

F. W. Goodhart and A. N. Martin. Purdue University, School of Pharmacy, Lafayette, Indiana.

A series of five hydrophilic surfactants, all polyoxyethylene stearates,[1] was used in aqueous solution to solubilize a group of solid benzoic acid derivatives. The concentration of solubilizate rendered soluble was a linear function of surfactant concentration which is characteristic of solubilization of semi-polar compounds. The critical micelle concentration of Myrj 59 was determined by two methods and these data support the theory of micellar solubilization by nonionic surfactants. With few exceptions, solubility was greater in the least hydrophilic surfactant solutions.

[1]Myrj surfactants, products of Atlas Powder Company, Wilmington, Delaware.

A Study Of The Effect Of pH On Preservative Efficacy. I, Acid Media.

Durward N. Entrekin. School of Pharmacy, University of Georgia, Athens, Georgia.

Tripticase Soy Broth adjusted to pH 2, 3, 4, 5 and 6 with McIlvane Buffer was used as media for this study. Micro-organisms for the innocculum were obtained from a soil sample which contained gram-positive and gram-negative rods, cocci, yeast and fungi. Some of the preservative materials have been previously investigated on a limited scale and the para-hydroxybenzoates were used as a basis for comparison. The preservative materials were used in three concentrations spanning their theoretical effective range. A record was made of visible growth, bacteriostatic or bacteriocidal effect at each concentration and pH level, and these were compared to control tubes.

Efficacy of some of the better known preservatives was confirmed with some of the newer materials falling into the effective class and others seeming to be ineffective.

The Permeability Of Excised Human Keratin To Lipid-Soluble Substances.

Dale E. Wurster and Robert E. Dempski. University of Wisconsin School of Pharmacy, Madison, Wisconsin.

A method has been developed to follow the rate of penetration of lipid-soluble substances through excised human keratin. These substances include fatty acids, alcohols and esters. Experimental evidence indicates that the center layers of tissue have a slower rate of penetration than either the outer or inner layers. Certain fatty acids which are also adsorbed by human keratin appear to penetrate more rapidly than those substances which are not adsorbed.

Preparation And Properties Of New Gastric Antacids IV. Aluminum Hydroxide—Magnesium Trisilicate.

Stewart M. Beekman. Reheis Company, Inc., Berkeley Heights, N. J.

The preparation and properties of several new combinations of aluminum hydroxide and magnesium trisilicate in gel and dried gel form are described. The mole ratio of alumina to magnesia of the various products ranges from 8-2 to ½-2. Various *in vitro* methods are used to determine the antacid characteristics including the acid consuming capacity test, Reheis and Mutch reaction velocity tests, a modified procedure of Holbert, Noble, and Grote, and a procedure of Fuchs. The latter two methods are carried out by means of an automated apparatus described in the first paper of this series.

The antacid properties are shown to be prompt and prolonged in the optimum pH range of 3 to 5.

Binding Of Drugs By Plastics: IV.

A. J. Kapadia and J. Autian. University of Michigan, College of Pharmacy, Ann Arbor, Michigan.

Recent reports have indicated that drug-plastic interaction may occur when a drug product is in contact with a plastic device. In these binding studies, it was ascertained that the rate determining step was due to diffusion of the solution into the plastic. In the present study, the relative diffusion coefficients were determined at a number of temperatures by an adaption of a method suggested by Berthier (*J. Chem. Phys.*, 49, 527, 1952). From the diffusion data, the activation energy was calculated for sorbic acid in each plastic material.

Interfacial Properties Of Powdered Material; A Study Of Caking In Liquid Dispersions. Adsorption Studies.

B. A. Haines, Jr. and A. N. Martin, Purdue University School of Pharmacy, Lafayette, Indiana.

The possibility of preparing suspensions of coated particles in a state of controlled flocculation which remain well suspended and free from caking is described. Sulfamerazine and bismuth subnitrate particles coated with cationic and anionic agents were found to possess electrophoretic properties similar to the coating agent. The construction of adsorption isotherms assisted in determining the amount of adsorbed material to provide desired coating characteristics. Sedimentation volume and the electrokinetic observation of zeta potential provided measurements of dispersion stability. As a result of this study, it is suggested that a typical suspension might contain various cationic, anionic or nonionic ingredients all coated with a cationic adsorbent, flocculated with an anionic electrolyte, and suspended with viscous hydrophilic agents.

Approximate Rates Of Shear Encountered In Some Pharmaceutical Processes.

Norman L. Henderson, Paul M. Meer, and H. B. Kostenbauder. Temple University School of Pharmacy, Phila.

Approximate values are presented for rates of shear encountered in the manufacture, handling, and application of pharmaceutical liquids and semisolids. Examples considered are the milling of semisolids; the flow of liquids from bottles, through pipes, small tubes, and hypodermic needles; and the topical application of liquids and semisolids. The importance of this information for the effective utilization of rheological data in the development, control, and packaging of non-Newtonian pharmaceuticals is discussed.

The Viscosity-Stability Of Certain Hydrophilic Polymers In Aqueous Solution.

Gerhard Levy, University of Buffalo, School of Pharmacy, Buffalo 14, N. Y.

The viscosity-stability of sodium carboxymethylcellulose, guar gum and sodium alginate, in aqueous solution, has been investigated. The "viscosity half-life" of sodium carboxymethylcellulose and guar gum increases with average molecular weight and with concentration. The "viscosity half-life" of sodium alginate also increases with molecular weight, but is independent of concentration in the concentration range studied. The viscosity-stability of sodium alginate increases with increasing calcium content. Methods for a meaningful comparative evaluation of the viscosity-stability characteristics of hydrophilic polymers are discussed.

The Reaction Of Dihydroxyacetone With Proteins.

John Buchter, Fred J. Bandelin, and Nelson Kanas. Research and Development Division, Strong, Cobb, Arner, Inc., Cleveland, Ohio.

Dihydroxyacetone is a polyfunctional ketotriose which reacts with proteins giving brown colored end products. This reaction is incompletely understood and was investigated for possible elucidation. Controlled reactions of dihydroxyacetone were carried out with certain amino acids, certain proteins and with metaproteins, globulins, prolamins, albumins, protamines and simpler proteins such as peptones and proteoses. The specificity of the reaction is noted and the results are discussed.

A Study Of The Cationic Exchange Properties Of Acid Activated Bentonite.

Earl W. Seugling, Jr. and Earl P. Guth. The Ohio State University College of Pharmacy, Columbus, Ohio.

The cation exchange activity of acid activated bentonite was studied using a series of β-Phenylethylamines. The amount of amine exchanged was found to be dependent on the structure of the amine. Phenolic substitution of the ring, hydroxyl and methyl substitution of the side chain, and nitrogen substitution affect the amount of amine exchanged. The effect of pH on the amount of amine exchanged was determined. The effect of ionic strength was studied. The nature of the cation used to produce the desired ionic strength affected the amount of amine exchanged. This effect was studied, also. The ion exchange isotherms for each amine were determined. Theoretical equations for the isotherms were subjected to experimental verification. The theoretical equations were based on the law of mass action taking into consideration the valency and activity of the ions undergoing exchange. The release of the amines from the bentonite was studied under conditions of varying pH and ionic strength. The amount of amine released during various periods of contact with simulated gastric and intestinal fluid was studied.

A Study Of Anionic And Cationic Surfactants In a Hydrophilic Ointment Base I. The Screening Program.

K. C. Patel, H. G. DeKay, and G. S. Banker. Purdue University School of Pharmacy, Lafayette, Indiana.

Sixty-two anionic and twenty-eight cationic surfactants have been screened for their application in the U.S.P. Hydrophilic Ointment formula. The screening procedures considered the physical properties and the pharmaceutical elegance (separation, water loss, color, consistency, spreadability, etc.) of the emulsions formed with the various surfactants. The compatibility of the ointment bases with eleven commonly used topical drugs and combinations of drugs was also determined. This screening program indicated that one cationic and three anionic surfactants were equivalent or superior to sodium lauryl sulfate as the emulsifying agent for Hydrophilic Ointment U.S.P.

A Study Of Anionic And Cationic Surfactants In A Hydrophilic Ointment Base II. The Effect Of The Surfactant And Its Concentration On Medicament Release.

K. C. Patel, H. G. DeKay and G. S. Banker. Purdue University School of Pharmacy, Lafayette, Ind.

Five hydrophilic ointment bases, prepared with one cationic and four anionic surface active agents, were studied for their drug release characteristics using three *in vitro* techniques: (1) a radioactive isotope, (2) a facteriological, and (3) a physico-chemical method. A modified physico-chemical method has been developed to increase the sensitivity and the speed of the color zones per unit of time. A comparative discussion of the three *in vitro* methods has been presented. The ointment sample prepared with two per cent of the anionic surfactant, sodium lauryl ether sulfate, produced the most satisfactory hydrophilic ointment, based on both physical properties and drug release. Increasing the concentration of surfactant retarded the release of the medicaments in all of the ointment bases studied with all three *in vitro* methods. Excellent correlation of results between the three *in vitro* methods was obtained.

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SPEAKING FROM THE U.S.A.

ROBERT P. T. YOUNG, B. CH. E., M.S. IN ENG., *was formerly Section Head in charge of Dentifrice Process Development, Basic Development, and Perfumes and Flavors for the Toilet Goods Division of The Procter and Gamble Company. He was with Procter and Gamble since 1941 with the exception of the six years he spent in the Navy—During World War II he was concerned with the design, manufacture, and inspection of 40 mm. ammunition; during the Korean war—propellants for rockets and missiles. A lieutenant commander, he was Head of the Test and Quality Control Division, Naval Powder Factory, Indian Head, Maryland. He received a Letter of Commendation for his contribution to the design and development of the Mark 43 solid propellant rocket grain.*

Glycerine IN DENTIFRICES

Benjamin Franklin once wrote, "Many complain of their memory, but few of their judgment." Since we can assume straight-off that readers of this article are people of good judgment, it seems quite proper to offer a memory-aid, or key-word, to use in considering the role that glycerine plays in modern dentifrice formulation. The key-word for a dentifrice formula is *BASHFUL* and all dentifrice ingredients can be classified into one of the following groups (remember the key-word):

B is for binders

A is for abrasives

S is for sudsers

H is for humectants

F is for flavors

U is for unique additives

L is for liquids

Glycerine is a humectant, and as you will see it has a rather central position in a good dentifrice formula. A humectant can affect every other ingredient, and its presence in the formula is, I believe, the principal reason the American people overwhelmingly prefer toothpaste to toothpowder. It may be of some interest in passing to note that the largest selling dentifrice in America (1959 figures) has the highest glycerine content.

Binders

B is for binders and binders stabilize the paste. All binders provide highly viscous aqueous systems, and the best are quite thixotropic or gelatinous in nature. The purpose of these stabilizers is to prevent the separation or stratification of the various ingredients used, and when one considers the diversity of these ingredients—from heavy, solid, inorganic abrasives to light liquid, organic essential oils—one realizes the magnitude of the binder's task.

One of the earliest binders used was glycerite of starch. This was followed by various natural gums: karaya, gum arabic, or gum tragacanth. Today, the principal attention by dentifrice formulators is directed toward seaweed derivatives (Irish Moss) and toward the synthetic celluloses. (1) In addition to these organic binders, bentonite, a native, colloidal, hydrated aluminum silicate, and Veegum, a complex colloidal magnesium aluminum silicate, have been recommended for use. (2)

Almost every edible thickening agent can be considered to be a potential dentifrice binder. A simple screening test to determine the potential usefulness of a material as a dentifrice binder is to make a 1% solution of it in a 50:50 glycerine-water solution. If the binder is incompatible in this system (and many natural materials such as locust bean, guar gum, etc. are), it is not likely to be a very satisfactory dentifrice ingredient.

Gershon et al. (2) mention that one of the best ways to make a toothpaste is to disperse the binder first in the humectant and then add this slurry to the aqueous phase. In this type of processing an essentially anhydrous system is needed for best dispersion, and glycerine is ideal.

In choosing a binder, particular attention must be paid to its interaction with all other ingredients. Since most abrasives contain trace quantities of cations (calcium or magnesium ions), these can interact at available sites on the binder molecule and cause firming or lumping on long-term storage. Some binders, particularly Irish Moss extractives, act synergistically with the sudsers to produce a more stable foam on brushing. It is necessary to balance the binder with the humectant to arrive at the ideal viscosity, and also to produce a glossy, short-textured product. Finally, the binder must be completely bland in flavor and odor, and it must be compatible with the unique additives used in the formula.

Abrasives

The purpose of dentifrice abrasives is to remove the stains which form on teeth. Ideally, these materials should accomplish this without damaging the soft part of the tooth structure (dentin) which is often exposed near the gum line.

The literature covering dentifrice abrasives is most fascinating. Historically, such exotic materials as pulverized eggshells, rouge, charcoal, wood sawdust, silicon carbide, and powdered cuttlebone have been mentioned. (3) The materials recommended for use today are much more commonplace consisting of :

Dicalcium phosphate	Magnesium hydroxide
Tricalcium phosphate	Diammonium phosphate
Calcium carbonate	and similar materials

Kuever (4) patented the use of insoluble sodium metaphosphate. Phillips and Van Huysen (5) reported that when this material was mixed with calcium phosphate some polishing action occurred. Special abrasives have also been designed for special purposes.

The interaction of humectants with abrasives is quite important to the "mouth-feel" of the dentifrice. Great care must be exercised to secure the proper balance between "chalkiness" on one end of the scale and "sliminess" on the other. Interestingly enough, there is a profound difference between humectants in this respect and glycerine seems to offer more flexibility in formulation than the others.

It is known that glycerine reduces the abrasiveness of the abrasives used without substantially affecting their cleaning power.

Sudsers

Longfellow (7) reports that soap has been replaced by synthetic anionic surface active agents in all the major brands of dentifrice. The principal sudsers in use today are:

Sodium lauryl sulfate
Sodium N-lauroyl sarcosinate
Sodium lauryl sulfoacetate
Dioctyl sodium sulfosuccinate
Sodium salt of sulfonated coconut monoglyceride

All of these materials must be highly purified to prevent imparting undesirable (mostly bitter) flavor notes to the dentifrice.

Citrus fruit and other acid foods tend to have a bitter taste if eaten soon after the teeth are brushed with a dentifrice containing a synthetic surfactant. (8) Sanders (9) has obtained a patent on blends of sodium lauryl sulfate (1 part) with monoglyceride sulfonate (2 to 5 parts) which are quick sudsing and have no more effect on the taste of orange juice than the pure monoglyceride sulfonate.

One of the differences between soap and synthetic surfactant is the feel or "slip" of the foam produced. Over the years people have become accustomed to the soft, slippery feel of soap, and the synthetics seem harsh or "squeaky-clean." Glycerine does much to overcome this objection—foams of systems containing synthetic surfactants are markedly smoother and more stable if glycerine is added.

Humectants

The principal purpose of using humectants in a dentifrice is to prevent the paste from drying out. The most serious type of dry-out occurs at the tube nozzle particularly when the cap has been removed and lost. Most pressure-packed formulae are particularly high in humectant level since normally no cap is used and because the polyethylene nozzle is rather readily permeated by air and water vapor.

When considering humectants for dentifrice only three materials are usually mentioned:

Glycerine **Propylene glycol**
Sorbitol

Propylene glycol is reported to have a slightly acrid taste. (10) It has not been widely used.

In considering the relative merits of glycerine or sorbitol as humectants for toothpaste, it is fair to state that glycerine offers all the advantages of a near anhydrous liquid. Sorbitol, which is a solid when anhydrous, tends to produce firmer pastes. Glycerine also has the tremendous advantage of being the traditional humectant used, and its interaction with all of the other ingredients in a dentifrice is established and well-known.

Flavor

One of the most important consumer properties of a dentifrice is its flavor. The flavors of the leading dentifrices in the American market are fundamentally mint, wintergreen, or root beer in type. A dentifrice flavor consists of volatile essential oils (peppermint oil, spearmint oil, methyl salicylate, menthol, anethole, etc.) and crystalline components—saccharin, cyclamate, salt, etc. The base stock also contributes flavor, and the most advantageous of the ingredients in the base stock, from a flavor point of view, is the glycerine. Carr, Beck, and Krantz (11) have furnished the following table:

Relative Sweetness of the Sugar Alcohols
(Sucrose Taken as 100)

Glycerol	108
i-Erythritol	238
Pentaerythritol	110
d-Mannitol	57
d,-l-Sorbitol	54
i-Dulcitol	74
Inositol	50

From the above, it appears that glycerine is twice as sweet as sorbitol. Mannheim (12) reports that a very popular dentifrice used in Europe during the '30s contained 38 per cent glycerine and required no, or very little, saccharin for sweetness.

Unique Additives

Therapeutic dentifrices have received increasing attention during the past ten years. They owe their performance to ingredients we have termed "unique additives."

The list of unique additives is a long one. Those intended to reduce caries have included:

Ammonia salts and urea compounds
to neutralize mouth acids.

Sodium N-lauryl sarcosinate
to act as an anti-enzyme.

Sodium oxalate
to build an insoluble film on teeth.

Hexachlorophene
to destroy mouth bacteria.

Stannous fluoride
to reduce the solubility of tooth enamel in acid. (13)

Tyrothricin
to act as a general antibiotic.

The search for unique additives has even gone as far as Ora S. Flower's (14) idea of adding living organisms, *Bacillus alcaligenes*, to the paste and thus inoculate the mouth with alkaline-producing bacteria.

New Zealand has the highest incidence of dental caries in the world and Drs. Irwin and Leaver (15) have clinically tested tetradecylamine acetate there.

Unique additives have been recommended for purposes other than reducing tooth decay. Mouth odor is a particularly important problem, and toothpastes green with chlorophyll were once in vogue. It is sometimes necessary to add a preservative to protect the paste itself from microbial attack and ethyl p-hydrozybenzoate at 0.1 per cent of formula has been recommended. (16) The removing of stain from the teeth by the addition of dextran to the formula was recommended by Russell and Nelson. (17)

Glycerine is a particularly valuable ingredient in a dentifrice when its interplay with the unique additives is considered. Many of these materials are reactive chemicals and more or less soluble in water. Instability of these actives through chemical reactivity of one type or another becomes a serious problem as the pastes age. One of the best ways to reduce this reactivity is to replace as much of the water as possible with glycerine.

Liquids

The common liquid in all dentifrices is water. Deionized or distilled water is recommended to minimize the possibility of color or flavor changes.

Small amounts of mineral oil have sometimes been used, principally to make it easy to extrude the paste from the tube. It is quite obvious that mineral oil puts a tremendous load on the sudsers.

Humectants and water make up the large bulk of the liquid phase of the dentifrice. The relative amounts used have a marked effect on the physical as well as the brushing properties of the paste. A good place to start in designing a new formula is 50:50 glycerine-water.

SUMMARY Using the key-word, BASHFUL, the formulation of a dentifrice has been discussed. It has been shown that glycerine interacts with each of the other ingredients, and that it is indeed an important and beneficial component of a fine dentifrice.

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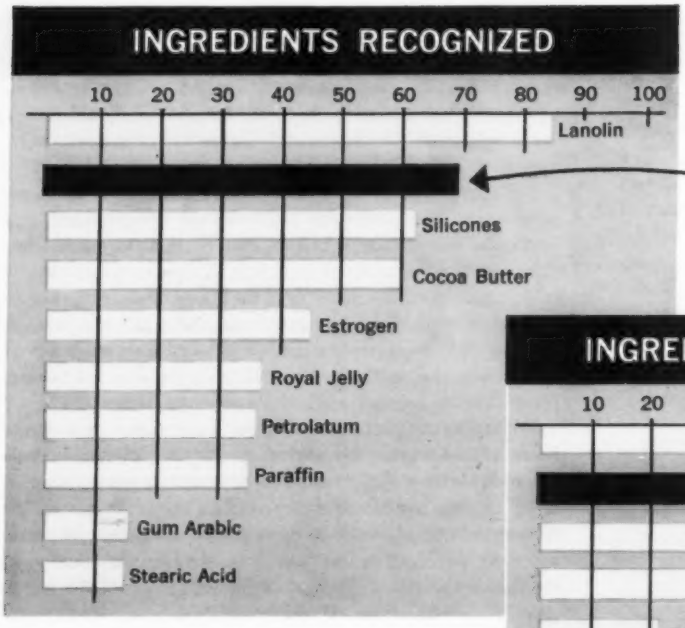
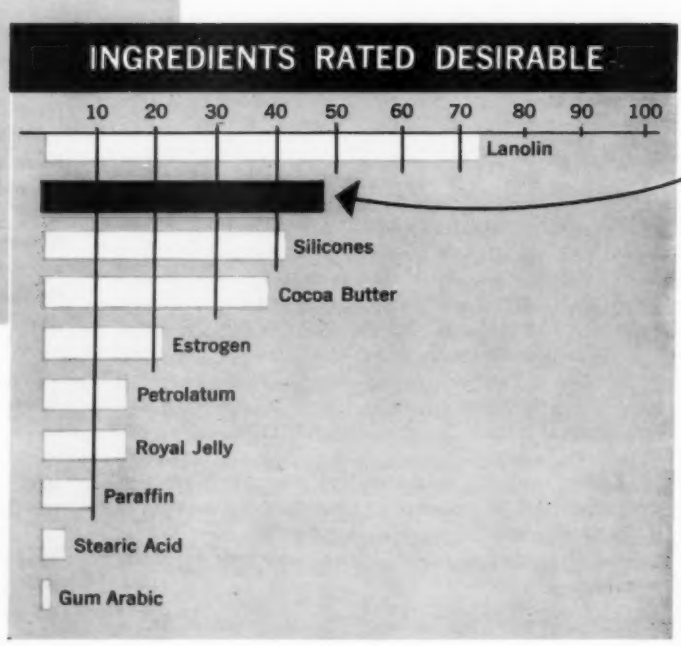
NOTE: Inclusion of formulations in this series of articles does not constitute a recommendation by G.P.A.—nor warrant that they are free from patent or other legal restrictions.

advertisement



GLYCERINE



Consumer panel votes YES! for Glycerine

Here again is evidence that "Contains Glycerine" is a phrase that promotes sales on any label. A panel of women having broad geographic and economic distribution recently placed glycerine second only to lanolin as an ingredient they recognized and rated desirable in toilet goods.

The soothing softness produced by Glycerine and Rose Water, Glycerine Soap and other long familiar products has registered with millions of American women. In addition, glycerine offers an unmatched combination of desirable propertes . . . controls body and consistency, lubricates, prevents settling, resists hardening and prolongs product life.

Glycerine deserves a feature spot on your label just as your product deserves glycerine. We'd be glad to supply technical information. Address your request to the Glycerine Producers' Association, 295 Madison Avenue, New York 17.

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Available immediately in 13MM to 24MM on any shape cap — including the ever-popular Futura design — from Richford's unique "in stock selections." In Standard and Spillproof styles, "Gold Peak" closures are the perfect companion for our complete line of Fantasy, Ambassador, Square, Exquisite and Round Bottles.

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Empire State Bldg., 350 5th Ave., N. Y., N. Y.

PACKAGING & PROMOTION

1

2

3

1—Shulton

A rigid plastic blown bottle, the first commercially available, is being introduced by Shulton, Inc. as a container for Old Spice Body Talcum. A polystryrene formulation provides chemical resistance to the oils of the talcum, holding in essential oils and preventing loss of the pleasing odor.

The rust and scratch resistant bottles provide uniform side wall thickness, close neck tolerances for friction fit caps, and eliminate dented and split seams. An added feature of the plastic bottles is reduced shipping costs because of lower freight weights.

2—Pacquin

A cream cuticle remover named Mani Magic is being marketed by Pacquin, Inc. The one ounce polythylene tube is attractively printed in pink and gold and has an elongated spout. An external coating results in a nail-polish-sheen for the entire package. Product protection, ease of application and lightness are the major reasons behind Pacquin's packaging selection.

3—Helene Curtis

Helene Curtis will enter the pharmaceutical field with three forms of acne treatment for the teen-age consuming public. Endac greaseless cream in a tube has been introduced for home use; Endac handy stick will be marketed to carry in pocket or purse; and Endac antiseptic clear skin cleanser will be promoted as the nighttime companion to Endac cream or stick.

The line will be introduced in all levels of the cosmetic trade, and will be free if the customer buys the product and sends Helene Curtis a coupon, which will be attached to the four-color pre-packed displays.

Advertising and promotion plans include teen-age disc jockey radio shows around the country and key magazines which teenagers and their mothers read.

4—Max Factor

"Swedish Formula Hand Creme" from Max Factor's International Division debuts nationally on December 27. An outstanding success abroad, the cream massages easily and completely into the skin, leaving no greasy or oily residue. Packaged in a decorated non-collapsible tube dispenser, the exact amount of Hand Creme desired can be easily dispensed and controlled. It also may be kept in the home or carried without any possibility of breakage. Another feature is that it maintains a fresh

4

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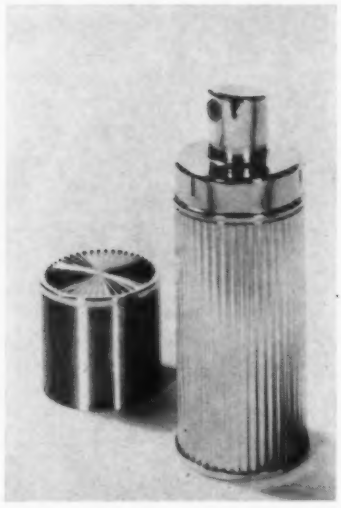


6

appearance even after the last drop has been used. The color scheme is gold and blue lettering on a soft white background.

The 2-ounce tube will retail for $1.00, plus tax. It is available in bulk units or a 12-piece prepack, complete with a merchandiser which holds and displays the packages. Introduction will be supported by ads in women's magazines, general magazines, nation-wide television and local newspapers in major markets, beginning in January.

5—Juliette Marglen

Juliette Marglen has introduced translucent stained glass lipstick. The product is a see-through lipstick which does not smear, cake or run. Available in only one color, Stained Glass Red, a companion product, Stained Glass Nail Glace, is also being marketed. The boxed lipstick will retail at $2.50.

6—Max Factor

Max Factor has introduced a Golden Spray Mist Canister for Hypnotique and Primitif fragrances. The decorative outer container has an inner cartridge holding the fragrance which can be replaced when it is consumed. Then the outer case can be used again and again.

The brushed brass cap presents a sunburst effect which is enhanced by the ribbing of the container's lower section. The valve insures an extremely fine spray of cologne when the spray dome is pressed.

The Golden Spray Mist Canister retails for $5. Refills are priced at $2.

7

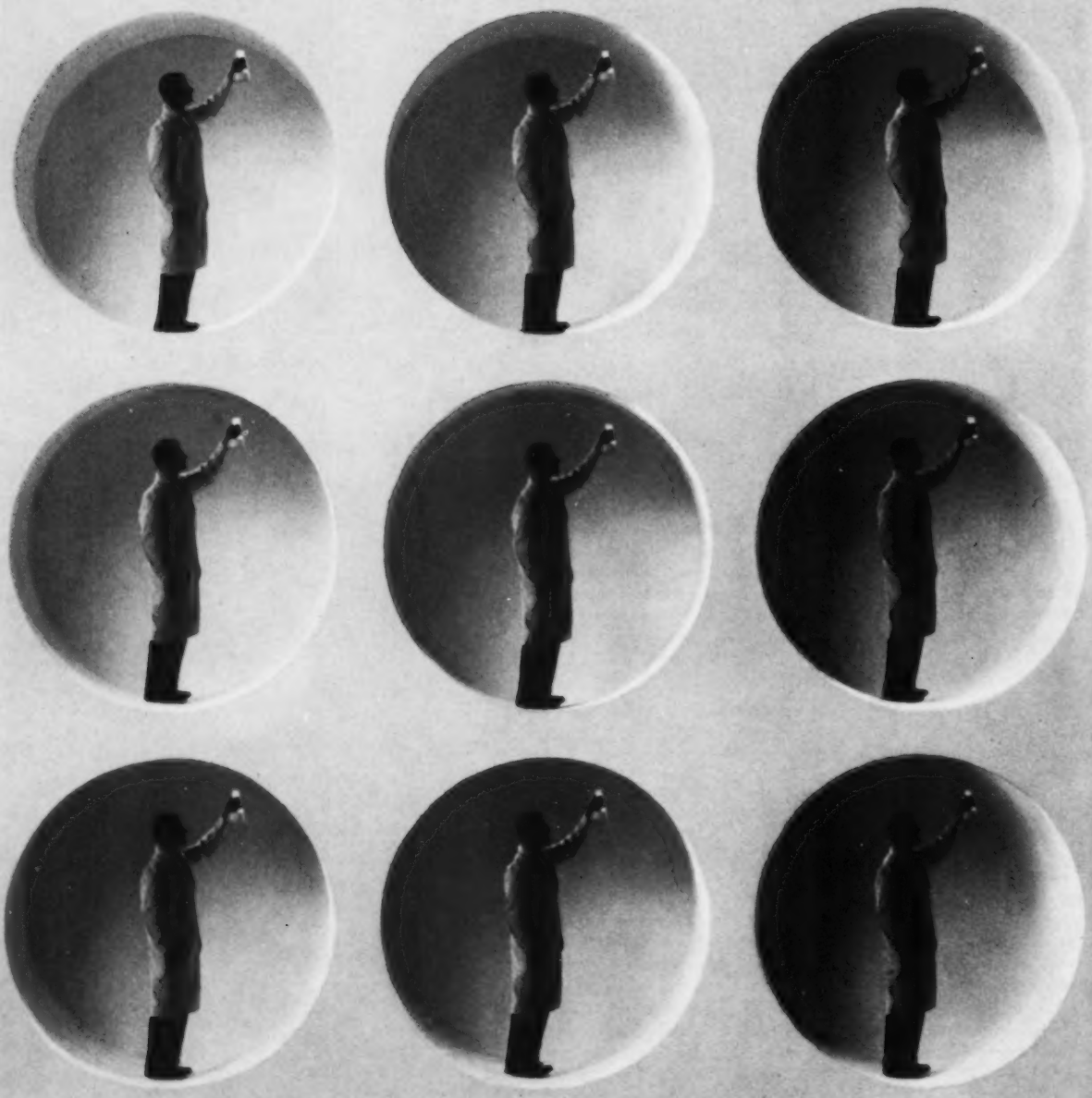
7—Parfums Ciro

A new aerosol package, designed to hold two ounces of mist concentre has been introduced by Parfums Ciro, Inc., for three fragrances, Reflections, Danger and New Horizons. The container is made of polished, gold-lacquered aluminum. An encircling band of fleur de lis and the Ciro logo are silk screened in white on the container. The aerosol is described as representing a new entry in the "economy-convenience" method of fragrance selling. The package will retail for $5.00.

8

8—Dana

A new package has been chosen for Tabu Perfume. The package has a white satin-textured finish. The base and top of the lid are soft brushed-gold and there is a shiny black platform to hold the bottle. This classic perfume in a new, modern package was introduced in October.



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. . NEWS AND EVENTS . . . NEWS AND

DAPG plans for the year

The New York Metropolitan Area Division of the Drug and Allied Products Guild has planned the presentation of a series of meetings on subjects of vital interest to drug manufacturers. DAPG is a rapidly growing association of the smaller drug manufacturers of the United States.

The first open meeting of this group was held November first, and the speaker was Arthur D. Herrick who addressed the meeting on the subject "Proof of safety in new drug applications". All such meetings are open to all companies in the field.

In view of activities in Washington, DAPG has requested of the FDA that it be invited to attend any hearings by the FDA relative to contemplated drug legislation. Plans have been made for a mid-year meeting in January and an annual meeting in June, 1961.

McKesson & Robbins starts new division in Massachusetts

McKesson & Robbins, Inc., has announced that construction has been started on a new wholesale drug division in Canton, Mass. The move is designed to improve the company's service to customers in the South Boston area.

The company operates drug divisions in Boston and Springfield, Mass.

Cosmetic career women elect new executive committee

At a luncheon-meeting on September 27th, held at the Waldorf-Astoria Hotel, New York City, the following new Executive Committee was elected by the membership: Alice Ackerman, Avon Products, Inc., Marie V. Carroll, California Cosmetic Association, Inc., Ruth Drake, Redbook Magazine, Bette Jackson, Shulton, Inc., Harriet Segman, Norman Craig & Kummel, Inc., Helen B. Stroz, Pacquin, Inc., R. Jane Williams, Schimmel, Inc.

FEMA convention

Plans have been completed for the 52nd Annual Convention of the FEMA. Convention headquarters will be the Savoy Hilton Hotel, 58th Street and Fifth Avenue. The dates for the 1961 Convention are Sunday, May 14 through Wednesday, May 17.

Toiletries tops on network TV

During the first eight months of 1960, Toiletries and Toilet Goods was the largest single group of advertisers in network television, according to estimates made by the Television Bureau of Advertising. Increasing just ten percent over the similar period of last year, the total expenditure of just over $75,000,000 just nosed out the product group of foods and food products.

Total network television advertising during this period was $442,000,000.

New Colgate Research Center

The Colgate-Palmolive Company has announced the start of construction of a multi-million dollar research center adjacent to the Rutgers University Science Campus near New Brunswick, New Jersey.

Planned as one of the most modern research installations in the United States, the two-story center will cover more than 200,000 square feet —with provision for future expansion.

When completed in the Spring of 1962, the building will house the Colgate-Palmolive scientists working in such fields as biology, oral health, pharmacology, biochemistry, physiology, enzymology and bacteriology. Much of the Company's long-range, fundamental studies will be undertaken there—as well as part of its product development work.

The plans call for about 175 laboratory units, a 20,000-volume library, and a seminar room that will accommodate 200 people.

Mr. M. G. deNavarre receiving Honorary Membership in British Society of Cosmetic Chemists from President, Robert H. Marriott at the annual General Meeting in London.

Vetiveryl Acetate*

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"Extra Fine"
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AMA — AAAS meeting on "Safe Use of Cosmetics"

The Committee on Cosmetics of the American Medical Association in cooperation with the American Association for the Advancement of Science will present a one-day symposium entitled "The Scientist's Contribution to the Safe Use of Cosmetics". This program has been arranged at the invitation of the A.A.A.S. and will be presented before the Pharmacy (NP) Section at the Association's 127th annual meeting in New York City on December 29, 1960.

The symposium will be divided into afternoon and evening sessions and will include panel discussions at each session.

Dr. Marion B. Sulzberger, New York, will serve as chairman of the symposium.

FDA — FLI annual conference

The fourth annual conference of the Food and Drug Administration and The Food Law Institute, bringing together both government and industry representatives to discuss areas of mutual interest arising from food, drug and cosmetic legislation, will be held this year on November 28-29 in Washington, D. C.

The two major "work" sessions will review recent developments in the administration of the Food Additives Amendment, the Color Additives Amendment, the Hazardous Substances Labeling Act, and prospective food and drug legislation. U. S. Food and Drug Commissioner George Larrick and Dr. Bernard L. Oser will act as moderators.

Dr. Charles Glen King, executive Director of the Nutrition Foundation, will moderate a panel discussion devoted to aspects of the food laws as they relate to the consumer. Mr. Depew, FLI president, will moderate a question-and-answer session devoted to current problems in the area of food and drug law.

Truesdail honored by AIC

Dr. Roger W. Truesdail, founder and president of an independent laboratory, has been awarded the American Institute of Chemists' 1960 Honor Scroll for "meritorious service to the profession of chemistry."

Addressing some 200 members of AIC's western chapter, Dr. Truesdail termed the independent scientific laboratory profession "as American as skyscrapers, malted milk shakes and hot dogs.

"If it had not developed spontaneously," he said, "it would have to be created now, for without such organizations in our industrial structure, commerce could operate only with great difficulty."

ABBB declaration to improve advertising

The Association of Better Business Bureaus adopted a "Declaration of Responsibilities for Improving Public Confidence in Advertising", as the opening of a national program to combat false and deceptive advertising and strengthen business self-regulatory procedures. The "Declaration" outlines the responsibilities of advertisers, advertising agencies, media and BBB's to asure truth and accuracy in advertising.

The basic concept is to promote local truth-in-advertising programs by trade and industry groups in BBB and other communities across the country. Advertising and business leaders will be called on to serve on special planning and coordinating committees. The program was developed by the ABBB's advertising improvement committee following several months of study.

A further step, now being planned, calls for the establishment of a national advisory committee for the "preservation of self-regulation" in business composed of leaders representing all segments of the economy.

This committee is expected to be established by the end of the year. Plans call for it to recommend a long-range course of action for presentation at the ABBB's annual conference in Phoenix, Arizona, early in May 1961.

Under the new program, BBBs will step up their trade-practice activities and intensify their shopping or investigation of advertising. They also will expand their information-education programs to focus attention on the threat to business self-regulation and the steps business is taking to correct abuses in the public interest.

CSMA Proceedings

The "Proceedings of the 46th Mid-Year Meeting" of the Chemical Specialties Manufacturers Association has just been published. Its 256 pages contain all papers, discussions and committee reports presented at the meeting, held in Chicago last May.

Copies may be obtained at $7.50 per copy, postpaid in the United States and Canada, and $8.00 per copy, postpaid to other countries, by writing Chemical Specialties Manufacturers Association, 50 East 41st Street, New York 17, New York.

Leonard A. Katz retires

Allan E. Katz and Leonard A. Katz jointly announce the retirement of Leonard A. Katz from F. Ritter & Co. and the flavor industry. Leonard A. Katz expects to follow interests in other fields.

Allan E. Katz, executive vice president of the firm, announces an expanded program of research and development to encompass every phase of the food, cosmetic and pharmaceutical industries. The Ritter plant, newest and largest processor of essential oils, aromatics and food flavors west of the Mississippi, is currently being enlarged and remodeled to accommodate new products being developed.

Unique mural for Pfizer Building

Nikos Bel-Jon, Greek-born artist and creator of a unique art form, has been commissioned by Chas. Pfizer & Co., Inc. to design and execute a large mural for the lobby of the new 33-story Pfizer Building under construction in Manhattan at the northwest corner of 42nd Street and Second Avenue.

Symbolic of the company's corporate slogan, "Science for the world's well-being," the mural will be 14 feet high and 36 feet wide. The artist will employ a combination of unusual techniques to achieve a three-dimensional effect through the refraction of light on metal.

Using steelwood and abrasives, the artist will etch designs into the smooth metal "canvas" or main body of the work. The surrounding background will be a mosaic formed of hand-cut metal chips. Various metals and alloys brushed and angled to refract light and tonal qualities will compose a frieze along the bottom.

EOA specification method published

The procedure for infrared analysis from the Essential Oil Association book of specifications has been accepted for publication in the recent issue of *Applied Spectroscopy*, a scientific journal devoted to both emission and absorption spectroscopy as applied to chemical analysis.

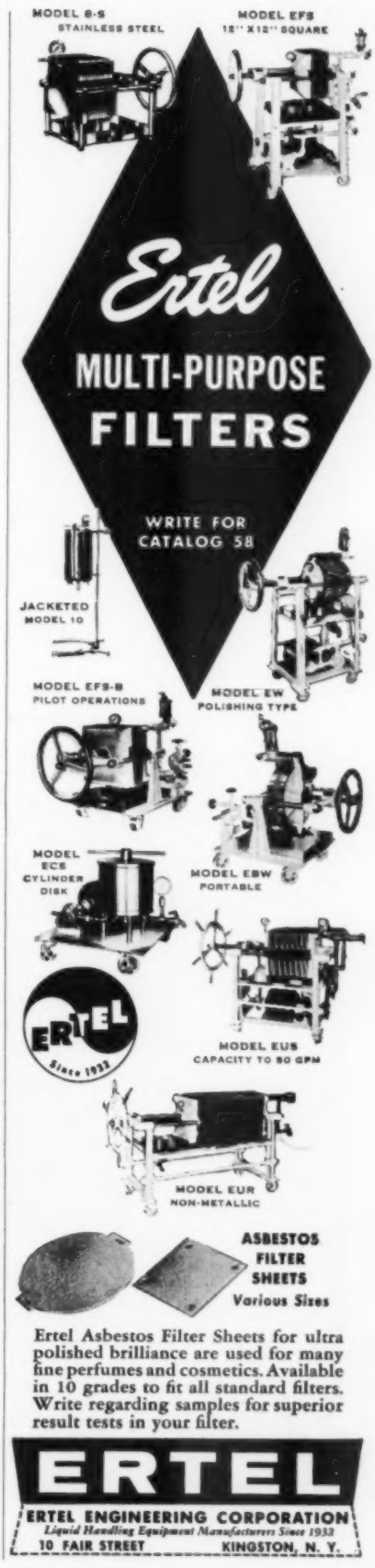
Publication of such a trade association procedure in a journal of this type is very unusual. However, in preparing this procedure the committee had to face the basic problem of deciding how detailed such procedures must be in order that differences between various laboratories, such as those of buyer and seller, would be minimized. At the same time, they tried to avoid spelling out every detail that would be obvious to a person who is accustomed to carrying out analyses of this type.

The present Instrumental Analysis

Miss Elizabeth Arden received an award from The Lighthouse for the Blind for Distinguished Service to Blind People.

Seen left to right are: New York Police Commissioner, Stephen P. Kenedy, who was principal speaker at the presentation; Miss Arden; William M. Robbins, President of The Lighthouse; and Thomas J. Watson, Jr., President of International Business Machines Corp., who was similarly honored.

Miss Arden's award was in recognition of her leadership in providing jobs for blind industrial workers.



Committee was founded as the Infrared Subcommittee of the Scientific Committee of the Essential Oil Association of 1954 by Dr. Ernst T. Theimer, now Research Director of International Flavors & Fragrances, at a time when infrared analysis was just beginning to be applied in the field of perfumery and cosmetics. Its original purpose was to explore the fields in which infrared spectrophotometry would be useful in the industry and to counter the claims being made at that time that this was a panacea that would replace all existing methods of analysis. The committee spent its first two or three years in examining and comparing spectra first of the pure chemicals, then of the isolates and, finally, of the oils themselves. In 1957, the committee decided that its greatest usefulness would be in the establishment of specific quantitative methods for the determination of particular components of essential oils and aromatic chemicals. At that time, because of the advent of gas chromatography and other new techniques, the name of the committee was changed to the Instrumental Subcommittee.

The first solid contribution of this committee was the above-mentioned procedure for infrared analysis. The hydroxycitronellal dimethylacetal specification was being prepared and a procedure was needed for the determination of free aldehyde in the acetal. Rather than simply writing a method for this particular analysis, a general procedure was prepared so that any type of infrared analysis could be carried out by following its directions. The Committee has since turned its attention to the establishment of a suitable gas chromatography procedure which will enable two analysts in different laboratories to prepare a particular column and obtain concordant results with its use. This was proved much more difficult because the means of calibrating such columns is not as well established as the means of calibrating wet chemical and spectro procedures.

Travelers

Wilhelm Karl, Prinz von Preussen, grandson of the last German Emperor, Wilhelm II, arrives in New York November 22.

A refugee in Western Germany after the war, he tried farming and finally became associated with Dragoco.

After a period of training, he was assigned the job of reorganizing a Dragoco subsidiary that had been totally destroyed in the German Eastern Zone. His remarkable success led to his appointment to the top management team of Dragoco International in 1955.

He works with Mr. C. H. Gerberding, son of the founder and new leader of the company, as assistant managing director.

SK&F awarded "Diana"

"Diana," the "Oscar" of the wholesale drug industry, has been awarded to Smith Kline & French Laboratories.

The award is from the National Wholesale Druggists Association and recognizes the drug manufacturing firm's efforts to keep current product information in the hands of wholesalers.

The award recognized SK&F's Tele-Tip cards printed with product information and designed to be of use by telephone sales personnel among the nation's wholesalers. New cards are distributed each six weeks. Tele-Tips are a joint project of the firm's advertising and distribution promotion sections.

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News of the Societies of Cosmetic Chemists

U.S.A. National

The annual meeting, reception and dinner dance of the Society of Cosmetic Chemists will be held at the Hotel Biltmore in New York on Tuesday, November 29, 1960. Mr. E. Allen Newcomb, program chairman, has announced the following speakers for the meeting: "Cosmetic Advertising Under the Federal Trade Commission Act" by Mr. Charles A. Sweeny, Federal Trade Commission; "Some Toxicologic and Clinical Studies with Dihydroxyacetone" by Leon Goldman, M. D., University of Cincinnati; "Systemic Effects of Topically Applied Cosmetics" by Frederick Reiss, M. D., New York University; "The Current Status of Acne Management" by John Strauss, M. D., Boston University.

The afternoon session will consist of a symposium on the subject of new manufacturing techniques with special emphasis on the transition from laboratory scale to plant batch production. The symposium will include a discussion of sonic emulsification by Drs. Donald M. Skanen and Harold M. Beal, College of Pharmacy, University of Connecticut; and six papers on emulsions, liquid-solid and solid-solid mixing by Mr. John F. Fischer of Patterson Kelley Company.

A reception will be held in the Madison Room of the Hotel Biltmore at 6:30 p.m. and will be followed by a dinner dance at 7:30 p.m.

Dr. Robert H. Marriott Medal Award Winner

The 1960 Medal Award of the Society of Cosmetic Chemists has been bestowed upon Dr. Robert Henry Marriott, F.R.I.C., Director of Products Research, County Laboratories, Ltd., Great Britain, for his contributions in chemical research in the cosmetic industry and in the leather trades.

Dr. Marriott's work has continued uninterrupted for almost thirty years, during which time he was twice Great Britain. He was one of the first researchers president of the Society of Cosmetic Chemists of to work in cosmetic rheology and helped plan the international congress on hair held in London two years ago. He also organized the first British Congress of Cosmetic Science in London. Dr. Marriott was

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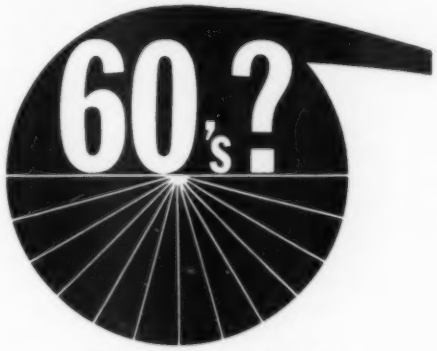

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elected the second president of the International Federation of Societies of Cosmetic Chemists to serve until August, 1961.

The Medal will be awarded to Dr. Marriott at the Society's Annual Meeting and Award Dinner, Tuesday, November 29th, at the Hotel Biltmore in New York.

Mr. H. J. Amsterdam, president of the Society, will present the award. Maison G. deNavarre, first president of the International Federation of Societies of Cosmetic Chemists and Chairman of the Medal Award Committee, will act as eulogist for the 12th recipient of the Medal Award of the Society of Cosmetic Chemists.

New York Chapter

Mr. Jerry Amsterdam was honored by his many friends at the annual President's Night meeting of the N. Y. Chapter of SCC, November 2, 1960. The guest speaker was Mr. Lester T. Conrad, founder of American Cholesterol Products, Inc., who discussed the "Resistance of acetylated lanolin derivatives to hydrolysis."

New England Chapter

The New England Chapter of the Society of Cosmetic Chemists met on Thursday, October 27, to hear "All about patents" from Miss Bessie A. Lepper of Arthur D. Little, Inc., international industrial research company in Cambridge, Massachusetts.

Miss Lepper is a chemist and a lawyer and combines her skills in both fields by serving as patent attorney for Arthur D. Little, Inc., and its clients. She writes and illustrates patent applications and then prosecutes them through the U. S. Patent Attorney's Office until they are granted, a procedure which sometimes takes several years.

At the September meeting of the Society, Mr. Raymond Gosslin, president of Gosslin Associates, spoke on "Market research in cosmetics and pharmaceuticals" to fifty members of the Cosmetic Chemists. He pointed out how successful market research can weed out products that will be "flops" from products that will be successes in the market.

SCC of Spain

The Society of Cosmetic Chemists of Spain held its first International Seminar of Cosmetic Chemistry the 5th and 6th of September in Barcelona. This meeting was timed to coincide with the visit of American members of the SCC during their tour of European countries.

The program of this seminar included: "The resistance of acetylated lanolin derivatives to hydrolysis," by Lester I. Conrad, Lalman Motiuk and Henry F. Maso, American Cholesterol Products Inc.; "Some remarks concerning the chemical structure and emulsifying power of polyethylene glycol-400 mono-oleate," by Jose O. Pascual (Surfac S.A.); "Chromatographic identification of the main hydrosoluble azocolours

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used in food, drug and cosmetic industry," by Jose M. Pla, C. Fauli and A. del Pozo, Faculty of Pharmacy, Barcelona.

"The applications of the infracord 137 to product control," by Mary Nebel and Maison G. deNavarre. "New colorimetric applications of the ferricyanide–ortodianisidine system. Indirect colorimetric determination of cysteine," by J. Artigas, F. Buscarons and C. Rodriguez-Roda, Analytical Chemistry Department, Faculty of Science, Barcelona. "On the stabilization of vitamin C by means of sequestering agents," by A. Badrinas.

SCC of Great Britain

The November meeting of this society will be held Monday, November 21st. The speaker will be Professor J. T. Davies, M.Sc., Ph.D., M.A., and will speak on the subject "What determines emulsion type?".

The December meeting will be held December 14th. The speaker will be Professor C. S. Whewell, Ph.D., F.R.I.C., F.T.I., on the subject "The chemistry of hair".

All meetings of this society are held at the Royal Society of Arts, John Adams Street, London, W. C. 2. Lectures begin at 7:30 p.m., with light refreshment available from 6:45.

The annual general meeting of the society will be held Friday, 26th of May, 1961.

This summer a number of one day symposia were organized by Societies of Cosmetic Chemists in different countries in conjunction with the Congress sponsored by the International Federation of Societies of Cosmetic Chemists in Munich.

The first one-day Conference took place in London on August 25th. A successful cocktail party was held the evening before, in the Library of the Royal Society of Arts, when members had a chance to meet the visitors from overseas. Eight papers were read and these will in due course be published, together with the discussion. An excellent dinner at the Connaught Rooms, when Dr. Hibbott was presented with a beautiful Lennox dish by the American Society, concluded the day's events. Altogether one hundred and eleven members from this country and fourteen visitors from abroad attended the Conference.

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PERSONALITIES

Dr. C. John Di Cuollo has been appointed to the Research and Development Department of the Colgate-Palmolive Company's Toilet Articles Division.

Dr. Di Cuollo, whose primary field of interest is bio-chemistry, joined the Skin Products Section at the Colgate-Palmolive Laboratories in Jersey City.

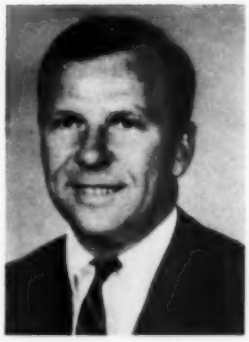
Mary C. Mathews has been appointed to the newly created position of department store supervisor for the West Coast, of Yardley of London, Inc. Miss Mathews will be responsible for the supervision of sales training, demonstrations and promotions.

Prior to joining Yardley, Miss Mathews was senior assistant cosmetic buyer of the Broadway Store, Los Angeles.

Herbert C. Cook

Herbert C. Cook was named pharmaceutical research chemist by the John C. Stalfort & Sons Company, Inc., contract packager. He spent several years in an executive capacity with a retail drug chain in Baltimore before going with Stalfort.

Joseph R. Dominica, a director of George Lueders & Co., Inc., was welcomed into membership of the Lueders Twenty-Five Year Club at a luncheon held September 29 in his honor. The members of the club presented Mr. Dominica with a watch and a set of matched luggage.



Clyde A. Brown, Jr.

Clyde A. Brown, Jr., has been appointed national sales manager of the Toiletries Division of Shulton, Inc.

Prior to joining Shulton, Mr. Brown was a merchandising executive at Young and Rubicam, Inc. Before that he was associated for 13 years with the Personal Products Division of Johnson & Johnson in both field and staff sales management capacities.

Mr. William O. Machamer has been appointed as field supervisor of the Allen B. Wrisley Co. sales force.

Mr. Machamer has had extensive sales experience in the soap and cosmetic field.

Mrs. Gail Ann Wildrick has been appointed to the Corporate Research and Development Department of the Colgate-Palmolive Company.

The section handles the fundamental studies of the chemical constituents of Colgate-Palmolive products. It also investigates new compounds of potential interest to the company.

Lloyd T. Flanner has been appointed technical service supervisor of aerosol propellants at Allied Chemical's General Chemical Division.

With the division 12 years, Mr. Flanner was associated with its aerosol technical service laboratory for the past three. Earlier he served as chief chemist of the division's Baton Rouge Works.

Dr. Maynard B. Chenoweth, an internationally known pharmacologist on the biochemical research laboratory staff of The Dow Chemical Company, has been named to the rank of research scientist.

While his research has been over a wide range, Dr. Chenoweth is particularly known for his classical work on fluoroacetate and as an authority on metal binding in biological systems. More recently he has made major contributions to the field of anesthesiology.

Mr. Wilbur E. Dewell, former vice president and director of McKesson & Robbins, Inc., has been elected chairman of the board of Lanolin Plus, Inc. He has been a director of the company for the past three years.

Otto G. Direnga has been named director of research information for Allied Chemical's General Chemical Division. Mr. Direnga for the past two years has been director of planning research.

George F. Polzer

George F. Polzer has been appointed to vice president in charge of purchasing, transportation and customer relations by Witco Chemical Company, Inc.

Prior to his promotion, Mr. Polzer was executive vice president of Ultra Chemical Works, Inc., a wholly owned Witco subsidiary.

Howard A. Trafton

Howard A. Trafton has been named vice president for sales of Rayette, Inc. Trafton joined the Rayette organization in 1957. Previous to this association he had been sales manager of Godefroy Manufacturing Company.

Mr. Charles Green and **Mr. Leo Bertisch** have been named to the board of directors of Lanolin Plus, Inc.

At a stockholders' meeting of Lanolin Plus, Inc., held on Wednesday, October 19, 1960, two new directors were elected to the Board, each for a term of one year.

Mr. Green is chairman of the board of United Whelan Corp., director of the New York, New Haven and Hartford Railroad, and director of Consolidated Laundries; and Mr. Bertisch is president and director of United Whelan Corp., director of the Trade Bank and Trust Co. of New York, director of Maimonides Hospital, and a trustee of Brooklyn College of Pharmacy of Long Island University.

Samuel Cohen, Arthur H. Henninger and **Dr. Herbert Fineberg** have been elected vice presidents for Glyco Chemicals (a division of Chas. L. Huisking & Co., Inc.). Samuel Cohen becomes vice president in charge of sales; Arthur H. Henninger, vice president in charge of operations at Williamsport, Pa.; and Dr. Herbert Fineberg, vice president and technical director.

Obituary

Edward A. Buckley, former president and head of the vanilla bean department of Thurston & Braidich, died recently. For the period during World War II he was president of the Vanilla Bean Association of America for which services he was given a citation by the French government.

Dr. Marvin W. Sage

Dr. Marvin W. Sage has been named technical director of Hodag Chemical Corporation.

Dr. Sage will be responsible for overall supervision of laboratory operations, including research and product development.

He is a former research director at the Van Straaten Chemical Co., and application research leader in the Central Research Department of Armour & Co.

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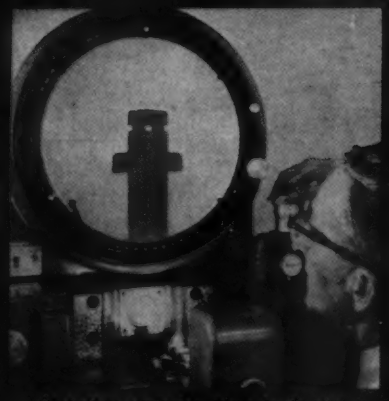

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